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BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 16 1941

ANAEROBIC CELLULITIS AND GAS GANGRENE

BY

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Infective gangrene in wounds is a subject of no little importance at present, and while our knowledge is yet far from adequate, enough facts have been established to render unnecessary some of the confusion which still exists regarding its diagnosis and treatment. Differences of opinion are greatest on the question of treatment, and there are wide divergencies in the results obtained from any individual method. These discrepancies are due in part to lack of differentiation between gas infection of the cellular connective tissues and true gas gangrene of muscle. A faulty diagnosis of gas gangrene is often made because attention is focused on the demonstration of gas or of gas-gangrene organisms in a wound instead of on the tissues in which the gas is produced, so that cures of gas gangrene are claimed as due to some particular treatment when in fact the condition was no more than a subcutaneous gas infection without involvement of muscle.

There are two stages in the diagnosis of a gas-infected wound: the first is the demonstration of gas, and the second the identification of the tissue involved. The demonstration of gas or of gas-gangrene organisms is easy and may be made by clinical, radiological, or bacteriological means; but the distinction between gas infection of the connective tissues and gas gangrene of muscle is more difficult and far more important, and can be made only on clinical grounds, radiology and bacteriology playing no part.

Three groups of cases occur; in these the organisms of infective gangrene may be found in a wound (1) as harmless saprophytes in ulcers, with no pathogenicity; (2) as pathogenic organisms producing an infection of the cellular connective tissues—gas infection of a wound or anaerobic cellulitis; or (3) as invaders of muscle—true gas gangrene.

1. Saprophytic Anaerobes

Numerous observers have described the saprophytic form of gas-gangrene organisms. Thus Fleming in 1915 found *Cl. welchii* in 127 out of 210 war wounds of varying ages; Manson (1932) found gas-producing anaerobes in 11 out of 32 chronic ulcers of the limbs; and Roberts, Johnson, and Bruckner (1933) found clostridia in 21.7% cases of unprepared abdominal skin, on 8.5% of surgical knife blades, and from the peritoneum in as many as 14.2% cases operated on for non-inflammatory conditions. Saprophytes of this type are capable of producing toxins: Muriel Robertson (1941) found highly toxic types of *Cl. welchii* in recent wounds, their presence in which had caused no symptoms. The bacteriological demonstration of gas-gangrene organisms in a wound has therefore little surgical significance.

2. Anaerobic Cellulitis

Gas infection of a wound without gangrene of muscle is probably the commonest clinical type of active infection by the gas-producing anaerobes. In this condition gas is produced in the wound, which may be demonstrated both clinically and radiologically; but there is no infection of muscle, and the patient may well recover without any active treatment. It is certain that many of these cases have been described as gas gangrene and reported as having been cured by different methods of treatment.

The site of the infection is the cellular connective tissues, and therefore there is no reason why the condition should not be recognized by the term "anaerobic cellulitis," comparable to other forms of cellulitis such as the streptococcal type. Following compound injury, and quite apart from muscle damage, conditions in the subcutaneous tissues may favour the growth of anaerobic organisms, with gas production from the proteins and carbohydrates in these tissues and from associated haematomata. This anaerobic cellulitis may spread in the fascial planes for some distance, but in the absence of a suitable pabulum of damaged muscle the infection may remain superficial or completely resolve when the supply of connective-tissue media is exhausted or when anaerobic conditions are terminated by suitable surgical incisions. An important feature in such cases is that the musty odour typical of gas gangrene is not present; this is probably to be correlated with the absence of muscle necrosis. With this local growth of anaerobes toxins are no doubt produced, and the patient suffers from a toxaemia of varying severity, depending on the extent of the damaged tissues and the nature and virulence of the organisms.

This condition is the one referred to usually as "local gas gangrene," but in the absence of muscle infection it would be preferable to distinguish it as "anaerobic cellulitis," particularly because its prognosis and treatment are so different from those of gas gangrene. Obviously the local treatment need never be drastic; if one can be certain that the condition is no more than a cellulitis, there is no necessity for radical surgery. Adequate treatment consists in removing skin stitches and opening up the wound or, in a more extensive case, making incisions under an anaesthetic. In addition, serotherapy and chemotherapy must be instituted, partly to mitigate toxaemia and also because they may help to arrest spread of the infection to muscle of impaired vitality, should any be present in the wound.

The following are three cases of anaerobic cellulitis:

Case 1.—Male aged 30. Road accident, 4/11/38. Multiple abrasions and contusions of lower limbs, with a puncture wound just above the left knee. Given 1,000 units of A.T.S. and 4,000 units of polyvalent anti-gas-gangrene serum. Operation two hours later showed only a large subcutaneous haematoma of the left thigh, and the wound was excised and sutured. On the fourth day there were signs of a gas infection, with crepitus and gas bubbles in the wound. The general condition was fairly

good. T. 101°, P. 108. Under general anaesthesia the wound was opened up and the infection was found to involve only the subcutaneous tissues. It was left open, with hydrogen peroxide dressings, and the infection soon resolved, the temperature becoming normal in three days. Culture of the wound exudate showed *Cl. welchii*.

Case 2.—Female aged 19. Road accident, 28/9/38. Multiple abrasions and lacerations of lower limbs and right hand. Given 1,000 units A.T.S.; wounds excised and sutured. The laceration of the right foot involved the incomplete avulsion of a large piece of skin of the dorsum with considerable soiling by road dirt. Next day the patient was ill. T. 101°, P. 134. Given 10,000 units of anti-gas-gangrene serum and 2 grammes of sulphanilamide t.i.d. A few stitches were removed from the wound of the right foot, when a little odourless brownish fluid escaped. The pulse remained 120-130 until the next day, when there were crepitus and gas bubbles in the wound. A further 20,000 units of anti-gas-gangrene serum was given. Culture of the wound exudate showed *Cl. welchii*. The general condition improved on the third day; there was no spread of the gas infection, and the wound suppurated and eventually developed a clean granulating surface.

Case 3.—Male aged 45. Air-raid casualty, 9/11/40. Compound fractures of left femur and left hand and perforating wound of left leg. Given 3,000 units A.T.S. Excision of wounds and packing with vaselined gauze four hours after injury. The wound of the left leg consisted of a penetrating track through the gastrocnemius; the limb was immobilized with skeletal traction. Immediately after operation he received 10,000 units anti-gas-gangrene serum and 2 grammes of sulphapyridine intramuscularly, the latter being continued as 1 gramme four-hourly. The following day, twenty-four hours after injury, the general condition was fair; T. 99°, P. 120. There was discoloration of the skin of the antero-lateral surface of the left leg just below the wound, with crepitus in this area, and a radiograph showed the presence of gas. There was a mild odour of stale blood in the wound, but no suggestion of the mouse-like smell of gas gangrene. Culture of the exudate showed *Cl. welchii*. Anti-gas-gangrene serum was given, a total of 150,000 units being injected during the next twenty-four hours in doses of 10,000 and 20,000 units at two-hourly intervals into the left thigh and upper end of the leg above the wound. Crepitus disappeared after twenty-four hours, and the wounds suppurated. The Hb on the fifth day was 50%, with 15,700 white cells per c.mm. The fracture united well and the wounds healed within fourteen weeks.

3. Gas Gangrene

The term "gas gangrene" should be reserved for the type of case in which there is gas production with necrosis of muscle. Its prognosis and treatment are different from those in anaerobic cellulitis, and failure to make this distinction is almost certainly the principal reason for the inconsistency of the results reported from various individual methods of treatment, particularly by *x* rays. While in every wound with anaerobic gas infection we should suspect gas gangrene and watch closely for it, it is unjustifiable to label every case as such unless or until it is established that there is muscle necrosis. It is of interest to note that the earlier clinical descriptions made this distinction clear, whereas more recent writers seem to neglect the point. Thus Fraser (1919), in discussing the types of anaerobic wound infection, clearly recognized anaerobic gas infection of the wound and gas gangrene of muscle, and Keen (1918) also regarded the distinction as of importance. More recently Hosford (1940) and Jocelyn Swan (1940) have called attention to it, and Tudor Edwards (1940) similarly emphasizes the difference between the two conditions.

Diagnosis of gas gangrene resolves itself therefore into the collation of evidence of necrosis of muscle, and the value of any signs and symptoms must be considered with reference to their use in this respect. These are: (*a*) general signs; (*b*) local signs; (*c*) clinical symptoms and signs; (*d*) inspection of muscle.

GENERAL SIGNS

The toxaemia of an established case of gas gangrene is of course severe, and a gas-infected wound in an extremely ill patient is almost certainly the site of infective necrosis of muscle. But in anaerobic cellulitis without muscle damage there is also a toxaemia, difficult to distinguish from early gas gangrene: it is after all merely a question of degree of toxaemia, since the organisms and toxins may be identical. All three cases of anaerobic cellulitis described above showed toxaemia, particularly Case 2, with raised temperature and pulse rate. Furthermore, it is often difficult to make an exact clinical estimate of the severity of a toxaemia. Again, the signs suggestive of gas-gangrene toxaemia, particularly the raised pulse rate, may be due to shock following the injury, primary haemorrhage, operation, or associated injuries. There are no constitutional symptoms or signs which are absolutely diagnostic of muscle necrosis.

LOCAL SIGNS

(*a*) *Bacteriology*.—The finding of anaerobic organisms does not give any information about the involvement of muscle.

(*b*) *Radiology*.—The demonstration of gas in a radiograph does not prove that this is being produced by disorganization of muscle. In Case 3 the radiograph showed gas, but there was never any clinical evidence of gas gangrene, and the gas was no doubt in the connective tissues. The use of radiography has been well summed up by Ogilvie (1940): "*X*-rays will disclose gas in the tissue planes, but the method is not particularly helpful, since the discovery of gas and the diagnosis of gas gangrene are two different things. The use of *x*-rays in diagnosis refers to gas infection rather than gas gangrene. If a case is not clinically one of gas gangrene the discovery of gas in a film will not make it so; if it is, photography is a waste of time."

CLINICAL SYMPTOMS AND SIGNS

Pain.—The complaint of pain in the presence of a gas-infected wound is suggestive of muscle involvement, but it is not always a symptom, and only one of the four cases described below had pain of any severity.

Odour.—This is one of the most important clinical signs, because it is probably due directly to the breaking down of muscle tissue as distinct from the connective tissues. The odour of gas gangrene is distinct; it is a musty or mouse-like smell quite different from the odour of stale blood which occurs in a discharging wound a few days old, such as is associated with anaerobic cellulitis. Unfortunately the actual chemistry of the odour is unknown; it would be valuable to have biochemical proof that the gas is formed from the protein or carbohydrates of muscle tissue. But clinical experience very strongly suggests that this particular gas emanates from the action of anaerobes on muscle and on no other tissue. If it is agreed that the breakdown of muscle alone gives rise to this particular odour, then this is the only sign (apart from direct inspection of the muscle) that is pathognomonic of gas gangrene as compared with anaerobic cellulitis. It is certainly a fact that, in spite of numerous other suggestive signs, the experienced surgeon when asked to see a doubtful case will base his diagnosis almost solely on the local clinical inspection of the wound, with particular reference to the odour. Thus Ashurst (1929) says that in the Second Battle of the Marne it became his habit "to wander around the corridors and smell the patients. Those that smelled like mice were operated on right away because they had gas gangrene. The rest of them could wait awhile."

In the present lack of knowledge of the exact nature and cause of the odour, the most that can be said is that it is probably the result of the action of one or more individual anaerobes on muscle tissue and that it is present in most cases of gas gangrene. Since infective gangrene may be due to a variety of organisms, it is not to be expected that all cases will have the characteristic odour, or even that all cases will have gas. Cases of infective gangrene in wounds without gas production have been described: Ghormley (1935) described one such case in which *Cl. septique* was identified. This type of case is unusual; undoubtedly in the vast majority of cases of infective gangrene of muscle there is gas production with the characteristic odour.

INSPECTION OF MUSCLE

This of course provides the most valuable evidence, but involves operation. Diagnosis is always confirmed thus and the extent of the lesion is determined. The gross features are well recognized and will not be described. The criteria of viability of muscle have been well summarized by Ghormley (1935) as: "If the muscle is red it may be viable; if it contracts when pinched it is usually viable; if it bleeds freely it is probably viable."

The diagnosis of gas gangrene is therefore essentially a clinical one, and depends mostly on the local signs, of which the most important is the odour. It is probably the experience of many that more cases are diagnosed in the early stages by the inspection of a wound as a deliberate routine rather than as the result of a suggestive temperature chart. It follows that a four- or six-hourly examination of the wound should be the practice in the immediate post-operative period in cases in which gas gangrene is a likely complication.

Clinical Types of Gas Gangrene

The commonly recognized types are: (1) local, (2) single muscle, (3) group of muscles, (4) segment of a limb, (5) fulminating.

It is suggested that this classification does not emphasize the important distinction between the first type, "local gas gangrene," and *all* the others. "Local gas gangrene" is really a cellulitis, not involving muscle, and it should be separate from the others, which differ among themselves only in degree: (1) Anaerobic cellulitis (so-called "local gas gangrene"). (2) Gas gangrene: (i) single muscle, (ii) group of muscles, (iii) segment of a limb, (iv) fulminating. This is not an academic distinction; its recognition would help to avoid confusion in diagnosis, in treatment, and, perhaps as important as anything, in the evaluation of methods of treatment.

Predisposing Factors in Gas Gangrene

In a wound contaminated with suitable anaerobes there must be factors which determine the infection of muscle as distinct from the connective tissues. These factors may be: (1) Variations in virulence of the organisms. (2) Suitable conditions for growth of organisms: (*a*) anaerobic conditions: (*b*) damaged muscle.

Variations in Virulence.—It is a well-known bacteriological fact that organisms vary in toxicity and invasiveness. It may be important in gangrene, but in any case it is a subject about which very little can be done in a practical way.

Suitable Conditions.—According to Eliason, Erb, and Gilbert (1937), "the important single factor in the production of gas gangrene is not contamination with the organism *per se* but rather a suitable soil in which it can grow." The essential medium is well recognized to be damaged muscle, and it may be effective in any particular case in one or more of three ways: (i) direct trauma to muscle; (ii) impaired blood supply; (iii) delayed excision. It is not necessary to go further into these well-established points, of which the three cases described below are illustrative.*

Case 4.—Male aged 42. A.R.C., 8/10/40. Antero-posterior perforating wound of upper third of left thigh and a small laceration 3 inches long on the lateral side of left calf. Operation seven and a half hours after injury showed a large haematoma due to a puncture wound of the upper third of the femoral artery, which was ligated. The leg wound showed bruising of a few fibres of the gastrocnemius. The wounds were excised and packed with flavine gauze, and sulphapyridine therapy was instituted. Post-operatively there was no pain in the leg, but inspection thirty hours after injury showed discoloration around the leg wound, with crepitus and the typical musty odour of gas gangrene. Amputation through the lower third of the thigh was performed, and subsequent progress was good. The two important predisposing factors in this case no doubt were the damaged femoral artery and delayed operation, the diminution of blood supply being sufficient to determine the rapid onset of gas gangrene in the presence of infection even in such a trivial muscle injury.

Case 5.—Male aged 26. A.R.C., 8/10/40. Multiple small lacerations of face, chest, right arm and forearm, and both legs. Operation eight hours after injury. There was a laceration 4 inches long on the back of the left leg, with some muscle damage, which was excised and sutured, with drainage. The numerous other wounds were excised, exploration of the right arm showing a complete division of the brachial artery. Post-operative sulphapyridine and anti-gas-gangrene serum therapy was instituted. Gas gangrene developed in the left leg fifty-four hours after injury, by which time he had been given 10 grammes of sulphapyridine and 80,000 units of anti-gas-gangrene serum. Amputation through the lower third of the left thigh was performed, and the subsequent progress was satisfactory. The right forearm developed some muscle necrosis and dry gangrene of the tips of the second, third, and fourth digits. The wound in the leg giving rise to gas gangrene was small, and the deciding factor in the case must have been its delayed local treatment.

Case 6.—Male aged 59. Railway accident, 18/4/40. Compound dislocation of right ankle-joint, with severely crushed foot, and compound fractures of upper thirds of left tibia and fibula, with considerable laceration of the calf muscles. General condition poor throughout. After two hours the left leg, which was attached only by nerves and a few muscle fibres, was removed in the patient's bed under local novocain and the stump packed with flavine gauze. Operation five hours later, the amputation stump being excised and the right foot amputated through the ankle-joint, the wounds being packed with flavine gauze; 3,000 units of anti-gas-gangrene serum given. Gas gangrene developed in the left thigh seventeen hours after injury, and the patient rapidly became delirious, dying ten hours later. The wound exudate contained *Cl. welchii* and other organisms in great numbers.

Prophylaxis of Gas Gangrene

Excision of Wound.—It is well recognized that the one almost certain way of avoiding gas gangrene is by immediate and complete excision of damaged tissue, especially muscle. The importance of the time factor should be emphasized. Actual practice, of course, may fall short of these desiderata owing to such things as the nature or severity of the injury or to the delay incurred in resuscitation from shock, in transport, or in arranging operation; so that it is important to promote other means of prevention, it being always understood that they are supplementary

* Cases 4, 5, and 7 have already been described in the *British Medical Journal* (1941, **1**, 273).

to, and not substitutes for, excision. In advocating the use of serum, Bates (1937) says: "Prophylactic serum without intelligent surgery cannot be expected to prevent the development of gas gangrene."

Sulphonamides. — Experimental evidence strongly supports the use of sulphonamides in prophylaxis. Thus Stephenson and Ross (1940) found that sulphanilamide and sulphapyridine protected mice from lethal doses of *Cl. welchii* and *Cl. septique*, sulphapyridine being more potent, although they were of no use against *Cl. oedematiens*. The best results were obtained from the combined use of sulphapyridine and serum therapy. Hawking (1941) has similarly obtained good results in guinea-pigs, the most effective drug being sulphathiazole, and the best route the local application. His results also showed the importance of immediate treatment, a delay of two hours considerably reducing its value and six hours rendering it useless. There is not yet enough material available to estimate the prophylactic value of the sulphonamides in gas gangrene clinically, but it is to be hoped that the results may support the experimental evidence. It is probably best to give sulphonamides both internally and locally in the wound, and it may even be wise to institute such treatment from the time of admission of the patient, before operation. Considering the rapid onset of gas gangrene, which under suitable conditions may well be from the moment of injury, it is likely that immediate local administration is the most important of all methods. Gordon Watson (personal communication) recommends the application of as much as 40 grammes of sulphanilamide to the wound. In the following case gas gangrene developed in an amputation stump in spite of the administration of a standard prophylactic dose of sulphapyridine given by intramuscular injection (8 grammes): no local application of the drug had been made.

Case 7.—Female aged 16. A.R.C., 8/10/40. Compound fracture of upper thirds of left tibia and fibula. Amputation through the lower third of the thigh, performed two and a half hours after injury, with closure and drainage. Post-operative sulphapyridine therapy instituted. Gas gangrene developed in the stump thirty-six hours after injury, the patient having had 8 grammes of sulphapyridine but no anti-gas-gangrene serum. The wound was opened up and irrigated with hydrogen peroxide, and 40,000 units of anti-gas-gangrene serum were given, but the patient died in seven hours.

Antisera.—Opinion is divided about the use of antitoxic and anti-bacterial sera. Experimentally, good results have been obtained by the combined use of serum and sulphonamides (Stephenson and Ross, 1940). Henderson and Gorer (1940) found that in mice the best effects were obtained by the combined action of sulphapyridine and antitoxin, or of sulphapyridine and anti-bacterial serum, against infections by *Cl. septique* and *Cl. welchii*. It seems that the use of serum in addition to the sulphonamides is advisable. It is probably best given both intramuscularly around the wound and intravenously. Case 3, which developed a *Cl. welchii* infection that remained localized as a cellulitis, was treated by repeated local intramuscular injections of serum.

Adequate prophylaxis should therefore probably comprise: complete and immediate excision of the wound; administration of sulphonamides, particularly local application; injection of antisera, especially intramuscularly around the wound.

Treatment of Gas Gangrene

Successful results in the treatment of gas gangrene have been recorded with methods varying from the most conservative, such as *x*-ray therapy, to the most drastic, such as amputation, and the unbiased critic must find it difficult to believe that one disease could call for such widely differing treatments. Thus while amputation is carried out as a life-saving procedure by some, others condemn this measure under any circumstances, as, for example, Kelly and Dowell (1936), who, in recommending *x*-ray treatment, say: "Since there is so much shock connected with amputation, and, furthermore, since the diseased area is not all eliminated by some of these amputations, it again seems worth while to omit amputations as an obsolete therapeutic procedure for gas bacillus infection."

Obviously, either many unnecessary operations are being performed or conservative treatment is being applied to a different class of case. Almost certainly the latter is a true explanation of these apparent discrepancies in the results of treatment, and results of numerous cases of anaerobic cellulitis have probably been reported as cures of gas gangrene by conservative means. It is essential to be certain that the case is not simply one of cellulitis before being satisfied that a particular treatment has successfully overcome gas gangrene.

The various forms of treatment are local excision and amputation, sulphonamides, antisera, and *x* rays.

Excision.—There is no doubt that if infective necrosis of muscle is present the only sure way of dealing with it is by adequate excision. If it is localized to one muscle or muscle group, these may be removed; if it is more extensive, involving a segment or more of a limb, amputation is called for.

Sulphonamides.—As in prophylaxis, there is every reason to use these drugs as a local application as well as by general administration. Again, their use does not dispense with adequate surgical excision. Bohlman (1937) reported three cases of gas gangrene which recovered after sulphanilamide therapy, and Jocelyn Swan (1940) recorded two successful cases following sulphonamide treatment in addition to surgery.

Antisera.—Bates (1937) reported 16 cases treated without serum in which the mortality was 50%, and 16 cases in which serum was used, with a mortality of 18%. Larson and Pulford (1930) reported 6 successful results in 7 cases treated with anti-gas-gangrene serum, the injections being made intramuscularly locally around the wound as well as intravenously. It is probably advisable to use antisera in this way in all cases.

X Rays.—Cases of success from *x*-ray treatment have been reported—e.g., by Kelly and Dowell in 1936. While it is impossible to be certain, it is very probable that the type of case which recovers with *x*-ray treatment is not true gas gangrene but anaerobic cellulitis. If, for example, Cases 1, 2, and 3 above were to be loosely called "local gas gangrene" they might be regarded as cures of gas gangrene due to any particular treatment that was given. It is essential in evaluating treatment to be certain of the presence or absence of muscle infection, and not to use the term "gas gangrene" unless muscle necrosis is present.

Summary

It is suggested that more care should be given in distinguishing between gas infections of the cellular connective tissues and true gas gangrene, and that the term "anaerobic cellulitis" should be used to describe the former.

Gas infections of wounds should be classified as: (1) anaerobic cellulitis (so-called "local gas gangrene"); (2) gas gangrene—(i) single muscle, (ii) group of muscles, (iii) segment of a limb, (iv) fulminating.

The importance of this distinction is in diagnosis, treatment, and evaluation of treatment. It is suggested that inclusion of all

varieties of gas infection of wounds as gas gangrene has been responsible for considerable diversity of opinion on the value of different methods of treatment.

The differentiation is essentially a clinical one, and the importance of odour as a sign of gas gangrene is stressed.

The histories are given of three cases of anaerobic cellulitis and four cases of gas gangrene.

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FURTHER OBSERVATIONS ON ANTISEPTIC SNUFFS

BY

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In continuation of the work previously described (Delafield *et al.*, 1941) some further observations on the effect of antiseptic snuffs on nasal carriers of staphylococci and other organisms are now presented. Seventeen of the subjects who provided the material for the earlier report have been further examined for twenty weeks—from early January to the middle of May. Nasal swabs, one from each nostril, were taken as before on three consecutive days each week and the technique of examination was in every respect identical with that previously described.

The Antiseptic Snuffs Tested

The snuffs which were the chief subjects of study had the following composition:

Sulphathiazole Snuffs:

(*a*) 10 parts by weight of sulphathiazole
90 „ „ „ magnesium carbonate

(*b*) 33.3 parts by weight of sulphathiazole
66.6 „ „ „ magnesium carbonate

(*c*) 50 parts by weight of sulphathiazole
50 „ „ „ sulphapyridine

Control Snuff:

(*d*) Light magnesium carbonate.

To these 1% of menthol may be added according to individual taste. If children are to be treated it would probably be best to omit the menthol. The general impression obtained is that (*b*) and (*c*) are better than (*a*), but that (*b*) and (*c*) are equally effective.

The use of lycopodium powder was discontinued, as two of the subjects showed signs of apparent sensitization after a week or two. These signs—profuse rhinorrhoea and headache—disappeared when magnesium carbonate was substituted for the lycopodium. Dr. M. H. V. Cameron (1941) directed attention to the possible danger of the lycopodium producing granulomata, and cited papers on this subject by Erb (1935) and McCormick and Ramsey (1941). Dr. Cameron is also of the opinion that magnesium carbonate might be a danger, as granulomata apparently due to the use of magnesium silicate have been described. It is probable, however, that when this reaction occurs it is not due to the magnesium ion but to the silicate ion.

Penicillin (1% in lycopodium powder), which had previously proved effective with the few subjects on whom it had been tried, was again tested at the same concentration but with magnesium carbonate powder as a diluent. In this form the penicillin was much less effective than it had previously been, and *in vitro* tests showed that in a few days the snuff lost its power to inhibit the growth of staphylococci. Prof. Florey states that penicillin is rapidly destroyed in an alkaline medium, and it is probable that there is a sufficiently destructive alkalinity on the surface of the particles of magnesium carbonate. Before the use of lycopodium was discontinued penicillin (1%) associated with sulphathiazole (33.3%) and lycopodium was tested on a few subjects, but was found to be no more effective than the sulphathiazole snuff alone.

Method of Taking the Snuff

The subjects have taken the snuff six times a day, either by the classic method or by sniffing it from one corner of a small folded triangular piece of paper. The amounts thus taken per day have been weighed. Twelve pinches or a day's supply of the sulphathiazole (33.3%) in magnesium carbonate weigh 0.075 gramme, representing an intake of less than 0.6 gramme of sulphathiazole a week. Similarly a week's intake of the sulphathiazole - sulphapyridine snuff weighs about 1.6 grammes. No toxic symptoms were ever observed, even after many weeks of snuff-taking.

Persistence of Snuff in the Nose

Study was made of the amount of sulphathiazole taken up by a nasal swab. Swabs from both nostrils of the 17 subjects were examined chemically about two hours after the last snuff-taking. In 11 out of 34 swabs sulphathiazole was demonstrated in amounts ranging from 0.03 to 0.39 mg. As the presence of the drug on the nasal swab might affect the bacteriological findings, all subjects were directed not to take any snuff during the twelve hours preceding swabbing, which was carried out at 10.30 a.m. After this instruction no sulphathiazole was demonstrated on the nasal swabs.

Results with Nasal Carriers of Staphylococci

All the 17 subjects under test were carriers of staphylococci: 3 were light but persistent carriers, whereas swabs from 14 yielded heavy growths of *Staph. aureus* or a coagulase-positive *Staph. albus*. These organisms were sometimes found together on the same plate.

In all cases except one the staphylococci were very greatly reduced as a result of treatment with sulphathiazole snuff, but they never entirely disappeared. Only one carrier was relatively resistant to the snuff in that the number of organisms found was but slightly reduced. In general, when the number of colonies found was small as a result of treatment the staphylococci were white and coagulase-negative, although small numbers of coagulase-positive white staphylococci and of *Staph. aureus* tended to persist in a few carriers. No carrier was definitely "cured." Two to three weeks after treatment was stopped heavy growths of *Staph. aureus* and coagulase-positive *Staph. albus* were again obtained. In a few instances the organism did not appear in profusion until between four and six weeks had elapsed.

Chart I illustrates the progress of one of these staphylococcus carriers. In all charts the counts from the right nasal cavity are represented by a continuous line, those from the left nasal cavity by an interrupted line. The ordinates represent the average of the weekly number of staphylococcal colonies counted on the blood-agar plates after forty-eight hours' incubation. Counts of over 100 were recorded as > 100, and are marked as 100 on the charts.

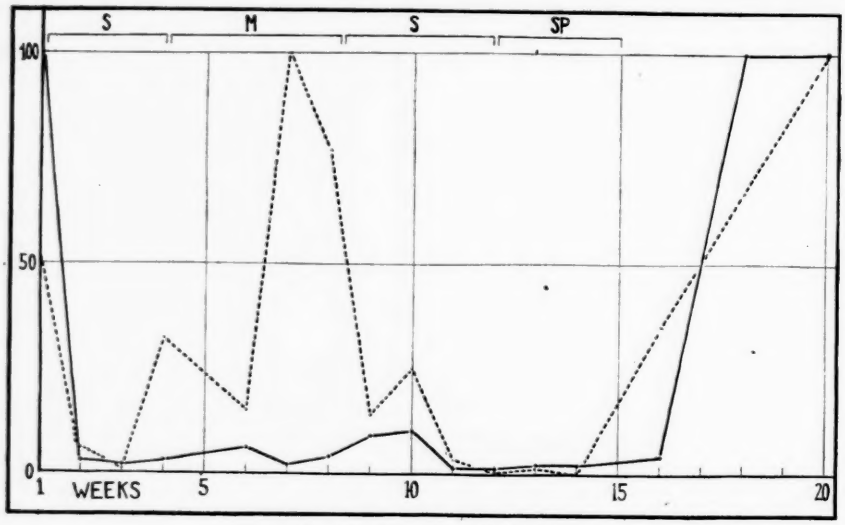

CHART I.—Carrier of staphylococcus.
S = Treatment with 33.3% sulphathiazole snuff.
M = ,, ,, magnesium carbonate control snuff.
SP = ,, ,, equal parts of sulphathiazole and sulphapyridine snuff.

Results with Nasal Carriers of Hoffmann's Bacillus

Eleven of the 17 staphylococcus carriers also carried Hoffmann's bacillus. In every instance the bacillus disappeared directly after sulphathiazole snuff treatment was begun. The 10% sulphathiazole snuff was as effective as the others. With 7 of these carriers the organism, having once disappeared after one course of treatment, was never again isolated even after many weeks. In 3 other carriers the organism returned in two to three weeks after the cessation of treatment, but after a third period of snuff the nose remained clear till the investigation ceased four weeks later. In the remaining carrier, in spite of treatments with one or other form of sulphathiazole snuff for thirteen consecutive weeks, the bacillus returned four weeks after he ceased to take snuff. Chart II illustrates the case of a carrier in whom the organism reappeared between courses of treatment.

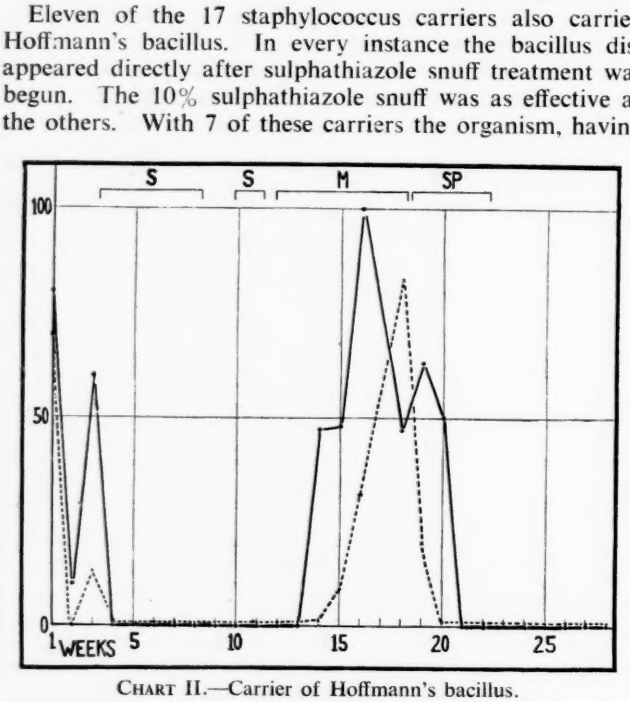

CHART II.—Carrier of Hoffmann's bacillus.
S = Treatment with 33.3% sulphathiazole snuff.
M = ,, ,, magnesium carbonate control snuff.
SP = ,, ,, equal parts of sulphathiazole and sulphapyridine snuff.

The findings with Hoffmann's bacillus clearly suggest that these snuffs might be of use in the treatment of nasal carriers of the diphtheria bacillus, and Drs. Payne and Auchinleck (1941) record promising results in a very small preliminary trial. In view of this and other reports since obtained, a systematic inquiry, adequately controlled, is being made by the Emergency Public Health Laboratory Service into the effect of these snuffs on convalescent cases and carriers.

Some *in vitro* experiments demonstrated that the diphtheria bacillus is less sensitive than Hoffmann's, and it would therefore be advisable to use snuff (*b*) or (*c*) if the treatment of nasal diphtheria carriers is to be attempted. It is of practical interest to record that children are eager and enthusiastic snuff-takers.

Results with Nasal Carriers of Pneumococci

The pneumococcus, so far as this investigation goes, seems to be completely resistant to every kind of snuff used in this experiment.

There were 9 subjects who carried pneumococci for varying periods. One carried the organism throughout the whole of the investigation, 3 carried it for only a short time, and from 4 the pneumococcus was first isolated about a week after the onset of a cold and disappeared after a few days or weeks. The ninth subject first had a pneumococcus in his nose during the third week of a cold and thereafter became a chronic carrier.

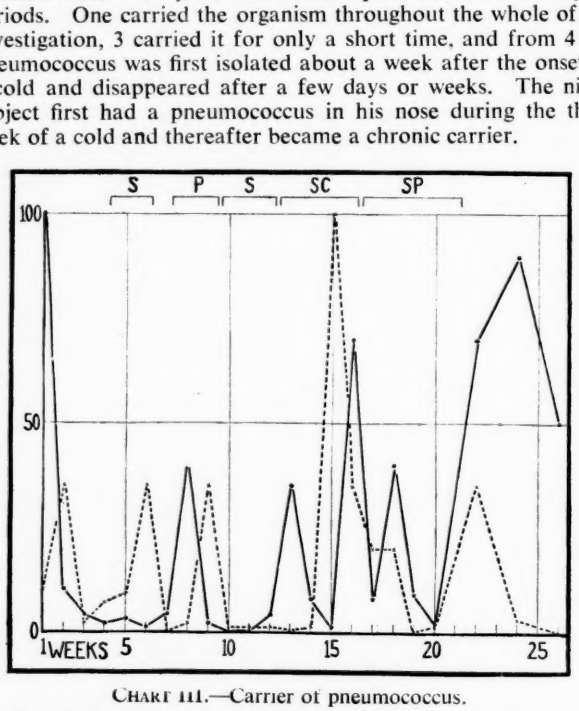

CHART III.—Carrier of pneumococcus.
S = Treatment with 33.3% sulphathiazole snuff.
P = ,, ,, 1% penicillin in magnesium carbonate.
SC = ,, ,, 1% penicillin with 33.3% sulphathiazole in lycopodium.
SP = ,, ,, equal parts of sulphathiazole and sulphapyridine

Two subjects who first showed pneumococci in a snuff-free interval continued to carry a pneumococcus in undiminished numbers, one for two weeks and one for four weeks, while taking sulphathiazole (33.3%) snuff. Another subject (see

Chart III) carried a pneumococcus during the entire investigation in spite of treatment with sulphathiazole (33.3%) snuff and sulphathiazole - sulphapyridine snuff. He was known to be a chronic pneumococcus carrier, Type III and other pneumococci having been isolated from throat and nose on many occasions over several years. Most of the swabs obtained during the present experiment grew Type III pneumococci, but sometimes a mixed growth of Type III and other pneumococci was obtained.

Two further subjects began to carry a pneumococcus while taking sulphathiazole (33.3%) snuff, and each continued to carry the organism for two weeks. Another subject began to carry a pneumococcus in the autumn of 1940, in the third week of a cold, while taking 5% proflavine snuff. He was later treated with sulphathiazole (33.3%) and sulphathiazole - sulphapyridine snuffs for thirteen consecutive weeks, but never lost the pneumococcus. The pneumococci isolated from these carriers were sensitive to sulphathiazole and sulphapyridine *in vitro*, which makes the failure of the snuffs to affect the carriage of this organism difficult to explain. It is possible that this organism tends mainly to colonize the sinuses and sinus cells and other inaccessible nooks and crannies in the nasal cavity.

Results with Other Organisms

Meningococci.—These organisms are not commonly isolated from the nose, and in this investigation the chance of obtaining a culture of meningococcus was small, because the swabs were emulsified in heart broth and the broth was then used to inoculate plates. Meningococci in heart broth may die in a few minutes. In spite of this, meningococci were isolated during January and early February from four subjects who were taking plain magnesium carbonate snuff. From one subject the organism was obtained only once, but from the other three it was obtained on three or four occasions during two weeks. After this each carrier started a course of sulphathiazole (33.3%) snuff, and the meningococci disappeared and were not seen again during the remaining weeks of this investigation, even during snuff-free intervals.

Haemolytic Streptococci.—One subject carried a haemolytic streptococcus (Group A, Type 5) in his right nostril only. It was grown from 19 out of 25 swabs during a period of ten weeks and did not disappear with sulphathiazole (10%) snuff treatment. Afterwards the carrier was treated with sulphathiazole (33.3% snuff) for seven weeks and then with sulphathiazole - sulphapyridine snuff. During the first three weeks of this treatment there were four positive swabs each yielding only one or two colonies. The organism then disappeared, and had not returned four weeks after cessation of treatment.

Neisseria catarrhalis.—There were five carriers of a Gram-negative coccus which did not ferment dextrose, maltose, or sucrose, and had dull grey-yellow colonies which could be easily pushed over the surface of the plate with a wire loop. Only one subject lost this organism when taking sulphathiazole (10%) snuff, and with him it never reappeared. Three others lost it during treatment with sulphathiazole (33.3%) snuff: with one of them it reappeared four weeks after stopping snuff. The fifth subject did not lose the coccus till treated with sulphathiazole - sulphapyridine, and it returned two weeks after stopping snuff.

Proteus vulgaris.—There was one carrier of this organism. Four swabs were all positive when he was first examined. It appeared less often under treatment with sulphathiazole (33.3%) snuff, and was grown from only one of eleven swabs during treatment with sulphathiazole - sulphapyridine snuff. After stopping snuff three out of seven swabs were positive. *In vitro*, *P. vulgaris* was only slightly sensitive to sulphathiazole even in saturated solution.

Antiseptic Snuffs in Relation to Colds

There is now further evidence from a number of people that the snuffs, if taken within two days after the onset of a cold, shorten the course of the disease. The discharge usually remains clear and the purulent stage is either prevented or lessened in intensity. There is no evidence that the snuff prevents colds.

Oral Insufflation of Antiseptic Powders

Three individuals were treated by the oral insufflation of sulphathiazole (33.3%) in magnesium carbonate. The tonsils and visible part of the nasopharynx were thickly coated with the powder three times a day on five days a week, from Monday to Friday. No evidence was obtained, from swabs taken on Tuesday to Thursday inclusive, of any alteration in the type or numbers of organisms present.

Summary

An antiseptic snuff containing sulphathiazole is effective in causing an extreme reduction in the number of staphylococci in nasal carriers of this organism. The carriers are not cured, as the organisms reappear within a few weeks of the cessation of treatment.

It is effective in the cure of carriers of Hoffmann's bacillus and is likely to prove effective in the treatment of chronic nasal diphtheria carriers.

It may be effective in the treatment of nasal haemolytic streptococcus carriers.

It may be of value in the treatment of carriers of meningococci.

It is worth further trial in cases of the common cold, in which it tends to affect the course of the disease favourably although it is not a preventive.

There is no evidence that it affects the nasal carriage of pneumococci.

We wish to express our thanks to all those who have submitted themselves to repeated swabbings and snuff treatment over many months. We are also greatly indebted to Messrs. May and Baker, Ltd., for their generous help in supplying us with the sulphathiazole and sulphapyridine used in this and the earlier investigation.

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JUGULAR THROMBOSIS AFTER TONSILLITIS

BY

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Three cases of jugular thrombosis have been treated. A description of the condition is best given in the details of their clinical history.

Case I

A man aged 21 was admitted to hospital on November 8, 1934. Two weeks before admission he had had a quinsy without pus formation, and swelling below the left mastoid. The temperature was 104°. This responded to local antiseptic treatment. Then just before admission he complained of pain behind the right mastoid process, but no pain in the ear or deafness. There was some thickening over the area of the mastoid emissary vein. The temperature was normal. The tympanic membrane was congested but translucent. Paracentesis was performed and about two drops of serous exudate was obtained. The patient looked so ill, and his temperature had been so high with his throat condition, that a cortical mastoid operation was performed. The mastoid cells were practically normal except for some congestion, and no pus was obtained. The lateral sinus plate was so posteriorly placed that the sinus was not exposed. After a swinging temperature for five days the clean mastoid wound was reopened and a lateral sinus full of pus exposed. This was opened and the outer wall cut away. Bleeding was secured from the torcular but not from the jugular end. Packs were inserted, being removed after five days. Before the operation both optic disks showed about three dioptres of optic neuritis. The whole condition cleared up, apart from an attack of German measles, one month after the first operation.

A blood investigation showed 75% haemoglobin, and ferrous iron was administered in large doses. There had been no swelling in the neck at the time of the lateral sinus operation,

and a jugular operation was not thought necessary. The small amount of serous exudate in the middle ear was thought to be due to the proximity of an infected jugular bulb, and the lateral sinus infection was obviously of too long duration to be put down to the mastoid operation.

Case II

A woman aged 34 was admitted on April 4, 1940, with a lateral pharyngeal abscess below the tonsil at the level of the epiglottis. She had had pain for a week, and for three days acute difficulty in swallowing, with three rigors. Her temperature was 103° when first seen. She was five months pregnant. There was a hard brawny swelling from the left mastoid to the sterno-clavicular joint, the breath was very foul, and there was some respiratory distress. Swelling was present in the submental region.

Under local anaesthesia the left jugular vein was opened and about 30 c.cm. of foul pus obtained. The vein was packed with a thin gauze strip and the wound left open, with the vein edges sutured to the skin. The patient's condition improved, but two days after admission swallowing was almost impossible, and she regurgitated all fluids. Under local anaesthesia the inner wall of the previous incision was cut, and dissection carried through fibrosed tissue to the inner side of the carotid sheath. This was retracted laterally and the thyroid gland medially, and 20 c.cm. of foul pus obtained from a large abscess against the lateral pharyngeal wall. A tube drain was inserted. Her condition again improved, but the submental region became swollen and the floor of the mouth was raised.

Under local anaesthesia an incision was made from the chin to the hyoid bone and pus was obtained from an abscess extending laterally in both submaxillary regions to the angles of the jaw and down to the geniohyoids. The patient's general condition improved and temperature continued at a level of 99°. There were no further changes in the local condition and the whole neck remained brawny. However, three days after the last operation her temperature suddenly rose to 102° and pulse to 160, and the patient died in a cyanotic condition on April 10.

At necropsy the left side of the neck was hard and indurated, with small localized abscesses scattered throughout the muscles. The jugular vein showed thrombosis just below the opening above the junction with the subclavian. There was also a thrombosis in the lateral sinus on the left side. The cavernous sinus was normal.

Besides having the abscess opened, she had been given a large amount of sulphapyridine (intramuscularly when she could not swallow the tablets). The pus from the internal jugular vein showed numerous Gram-negative bacilli and diplococci, and a fair number of Vincent's organisms. On culture *Staphylococcus aureus* was grown. Her haemoglobin never fell below 85% and the leucocytosis varied between 26,000 and 22,000 per c.mm. In this case a more extensive operation should have been done at first—opening of the jugular, extension down the lateral wall of the pharynx, and dissection deep to the submaxillary gland.

Case III

A woman aged 54 was admitted on March 6, 1940, with a history of sore throat for one week, a temperature of 104°, a quinsy on the left side, and a large brawny swelling on that part of the neck. With local treatment and sulphapyridine the condition in the throat cleared up and the temperature was normal in two days. There was still some swelling below the left mastoid, and the patient's temperature was reduced to 101°. At this time her haemoglobin was down to 55% and red cells to 3,000,000; leucocytes were 21,000 per c.mm. On March 19 her temperature rose to 106°; a blood culture was negative, but next day the left internal jugular was opened low down in the neck and pus containing pneumococci and streptococci was evacuated.

The patient's condition now showed some improvement, but she tended to have breathless attacks at times. The pharynx and larynx appeared normal, but on examination of the chest crepitations were found at the right base and radiographs revealed some dimness of the lower half of the right lung. Three blood transfusions were given at weekly intervals. The sulphapyridine was stopped and sulphanilamide was given in regular doses over three weeks. The pulse rate showed a steady rise and the respiration rate at times was over 40. On April 14 the jugular vein was opened up to the mastoid process and down to the sterno-clavicular joint. Blood clot was obtained but no pus. There had been some question of the thrombosis spreading to the subclavian vein, but the condition of the patient was too bad to warrant operation on this or to expose the lateral sinus.

However, on April 17 symptoms of cavernous sinus thrombosis appeared and the patient died next day. A few hours before death she coughed up 3 oz. of bright blood. As a necropsy was not allowed the source of this could not be ascertained, but was probably the right lung. This loss of blood was not of much consequence, as two days previously her haemoglobin was up to 92%.

Summary of Literature

Several writers have reported cases of this condition, but a description of it seems to have evaded the textbooks. Most of the articles were in the American literature, but van Gilse and Benjamins, in personal communications, have described cases to me. On the Continent drainage of the internal jugular vein has apparently been sufficient, but some of the American surgeons have found it necessary to open and drain both the internal jugular and the lateral sinus. This, I think, should have been done in my last two cases, but of course the second patient was too ill to withstand any further surgical endeavour.

The cases recorded in the United States certainly give better results than mine. Stone and Berger (1936) report two of their own with recovery, two of Eagleton's, and one of Kerman's. Out of five there were three recoveries, in each of which cases the neck and lateral sinus were operated on. Porter (1937), in reporting his case, is also of the opinion that this should be done. Gilmore's case (1939) recovered after only the jugular operation. Beck (1934) seems to favour this, but he had one case in which the lateral sinus was opened because of mastoiditis. Nussbaum (1929) collected 58 cases with 23 recoveries up to 1927, so it may be seen from the literature that the condition carries a high mortality.

Discussion of Treatment

Points in the treatment may be summarized as follows:

1. The operative treatment must not be delayed until a positive blood culture is obtained. Rigors may not occur; sometimes there are feelings of chill.

2. If the external swelling does not begin to subside one day after satisfactory incision of an abscess in the pharynx external operation is necessary.

3. If the condition of the patient does not improve after the internal jugular is opened, drainage of the lateral sinus should be performed. Only about four days should be allowed for this improvement

4. As regards the sulphonamide group, the last two cases had large amounts of sulphapyridine before operation, and it was noticed that any abscesses found were walled off by strong fibrous-tissue capsules, which made the dissection in the neck very difficult. Also the pus in these abscesses seemed to be thick and semi-organized by fibrin deposits. At necropsy the second case showed muscles and neck contents bound together with small abscesses scattered in the hard fibrous mass almost like actinomycosis. It seemed to me, therefore, that it would be more reasonable in a case that was likely to require opening of abscesses in the neck, especially abscesses among muscles and fasciae, to retard the administration of these drugs until the abscesses could be opened, and opened widely. As Beck (1932) states: "In cervical fascia infections drainage placed in advance of involvement is better than drainage which only trails the involvement." From consideration of these two cases it is my impression that pre-operative treatment by the sulphon-

amide group causes so much scarring and deposit of fibrous tissue that it hinders efficient drainage. This may be said to be a sweeping statement when founded on two cases, but a similar condition can be seen in cases of mastoid abscess that have had large doses of these drugs. Therefore in future cases of deep neck infection I should operate first and then use the sulphonamide group in large doses by mouth, parenterally, or by packing the wound, with the proviso that my operative drainage should be extensive and that it entirely covered any region likely to be infected.

5. The direction of spread of the infection and places that should be inspected for possible infection need not be gone into here. Mosher (1929) has described these matters in detail. It is as well to complete the drainage of the neck region in the one operation, as a second attack may have to be done with landmarks lost in fibrous tissue and difficult to find.

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ECONOMY IN THE TREATMENT OF IMPETIGO AND SCABIES

BY

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The experience of twenty months of wartime dermatology has shown that impetigo and scabies are by far the commonest and most troublesome of skin conditions occurring in the Navy. It has also been observed that before admission cases have been subjected to various forms of treatment. This, it is felt, lengthens the duration of these conditions and is uneconomical. Rapidity of cure and economy in drugs are essential in wartime practice.

The Therapeutic Requirements Committee of the Medical Research Council (1940) classified the drugs employed in dermatological practice and stated:

1. For many of the purposes for which ointments are often prescribed pastes and creams are more satisfactory and require only about half the amount of fatty basis.

2. The amount of mercury used could be greatly reduced, and it need only be available for trial in cases in which alternative antiseptics have not proved satisfactory.

3. A large number of chemical substances will destroy the acarus, and all local treatments depend largely on the efficiency of application. Sulphur ointment still remains one of the most efficacious remedies, and the frequency of sulphur dermatitis has been overstated. If supplies of benzyl benzoate are short this substance would be best reserved for treatment of children.

In view of the above findings, and in the hope that a greater uniformity in the methods of treating impetigo and scabies would result both in a quicker turnover of cases and in economy, the following suggestions are given. More uniformity of treatment would be of value in the Services, where one medical officer so rarely sees a case from onset to complete cure.

Impetigo

Opinions differ as to the most satisfactory treatment of impetigo. Andrews (1938) advises 5% ammoniated mercury ointment, and this would appear to be the treatment most commonly used. Forman (1938) advocates a lotion with copper and zinc sulphate (eau d'Alibour). Roxburgh (1941) prefers a paste or cream with 2% ammoniated mercury incorporated, and also mentions the occlusive treatment with elastoplast. He states that powdered sulphanilamide has been used, but that no figures are as yet forthcoming. Many other antiseptics have also been used, generally in aqueous solutions.

As a result of the study of 74 cases of impetigo contagiosa in hospital during 1940 and the early part of 1941, a technique was devised which on the whole gave satisfaction. The procedure was softening of the crusts with a sulphanilamide ointment (see 1 below), which took approximately forty-eight hours. The areas were then found to be clean and to be oozing serum. A paste consisting of 2% ammoniated mercury in zinc paste was next applied twice a day with only superficial cleaning before reapplication. No attempt was made to remove the adherent paste over the denuded areas. After the paste had been in use for five days it was removed completely with olive oil and the lesions were examined. Any areas still showing evidence of irritation or a tendency to exude serum then received paste for a further seven days. When all lesions were dry and healing eau d'Alibour was applied to the area night and morning for one to two weeks.

Recently it was decided to replace the mercury in the paste by one of the aniline dyes. By this means it was hoped to bring about an improvement in treatment and to save mercury. Brilliant green was chosen as the dyestuff for two reasons. In the first place, brilliant green is bactericidal to *Staph. aureus* in a dilution of 1 in 4,000,000. Secondly, the stearate of brilliant green is fat-soluble and can be incorporated in a paste. Brilliant-green stearate was therefore made up in zinc paste in a strength of 1% (see 2 below). A small number of cases have now been treated with brilliant-green stearate paste, and the results so far achieved have been highly satisfactory.

TABLE I.—*Brilliant-green Stearate Paste in Impetigo*

Case No.	Organism	Days on			Days Ill
		Sulphanilamide Ointment	Brilliant-green Paste	Eau d'Alibour	
1	Staph. aureus	2	5	–	7
2	Not cultured	4	10	–	14
3	Staph. aureus	2	7	–	9
4	,, ,,	2	5	7	14
5	,, ,,	2	5	7	14
6	,, ,,	2	5	7	14
7	,, ,,	2	12	7	21
8	,, ,,	2	12	7	21
9	,, ,,	2	12	7	21

1. *The sulphanilamide ointment* is prepared as follows: Sulphanilamide, 5 parts, and glycerin, 30 parts, are dissolved with the aid of gentle heat. Adeps lanae anhyd., 32.5 parts, and paraff. molle flav., 32.5 parts, are then heated gently to melt and incorporated with the sulphanilamide solution. The preparation is stirred until cold.

2. *Brilliant-green stearate* may be prepared by adding excess potassium hydroxide to a solution of brilliant green *B.P.C.* (sulphate) in water. The resultant precipitate is collected, washed, and heated with an equal weight of stearic acid. The paste is prepared as follows: Brilliant-green stearate, 1 part, and ung. simplex, 50 parts, are heated to liquefy, and are incorporated with zinc oxide, 25 parts, and amylum pulv., 25 parts, the whole being stirred until cold.

Scabies

Much has recently been written on the treatment of scabies and many remedies have been advocated. This, among other facts, adds to the difficulty of one who has to treat unsuccessful cases when notes on previous treatment are not forthcoming. Approximately 50% of the cases

receiving treatment in this hospital are secondarily infected, and the majority of those have received treatment with sulphur before admission.

The therapeutic agent now employed is an oil-in-water-type emulsion of benzyl benzoate prepared with triethanolamine from the following formula:

Benzyl benzoas	33.3
Ac. stearic.	2.5
Triethanolamine	0.5
Aq. dest. ad	100.0

Dissolve the stearic acid in the benzyl benzoate with the aid of gentle heat. Cool to 38° C. and add the triethanolamine dissolved in half of the water. Shake to emulsify and gradually add the remaining water, shaking after each addition.

It has been found that the temperature of preparation considerably affects the stability and viscosity of the emulsion. The product described here showed no separation when placed in a refrigerator for six hours at 0° C.; and when incubated for six days at 37° C. there was slight separation, but it immediately re-emulsified on shaking. Emulsions prepared at higher temperatures were not so stable. The routine of benzyl benzoate treatment as described by King (1940) was followed. It was hoped to confine the treatment to one application, but some cases have required two or more.

Results

The cases so far treated by this method number 39, and they must be divided into three groups:

I. Primary non-infected scabies (23 cases).
II. Secondarily infected scabies (5 cases).
III. Secondarily infected scabies which have failed to respond to earlier treatment (11 cases).

All cases were examined daily for at least one week following completion of treatment. Owing to the degree of secondary infection many remained under observation for a much longer period.

The number of applications found necessary are shown in Table II.

TABLE II

Group	No. of Cases	No. of Applications						Results
		1	2	3	4	5	6	
I	23	18	2	3				No failures
II	5	3		1		1		,, ,,
III	11	4	2	4			1	4 ,,

78% of the primary non-infected type and 42% of the secondarily infected cases were cured with one application. There were no failures in the non-infected cases, but 25% of those secondarily infected did not respond to this treatment. The failures had all been previously treated unsuccessfully with sulphur ointment, but were ultimately cured by mitigal, or dimethyldiphenylene disulphide (I.C.I.).

Conclusions

We feel that the importance of using a paste in place of an ointment in the treatment of impetigo is not fully realized or sufficiently emphasized. It is also considered that the substitution of a fat-soluble aniline dye in place of the time-honoured ammoniated mercury is a step forward in treatment as well as a justifiable wartime economy.

The use of a stable emulsion we feel is of advantage in the treatment of scabies. The emulsion is easy of application; only one-third of the amount of benzyl benzoate is required for a treatment as compared with the commonly used mixture of soft soap, alcohol, and benzyl benzoate; and the danger of irritation and therefore of secondary infection is reduced to a minimum. Finally, the stability of the emulsion is of undoubted value in the Services, where varying temperatures are encountered.

Summary

It is suggested that a fat-soluble form of brilliant green might replace mercury in the treatment of impetigo.

It is stressed that a paste might with advantage be used in place of ointment in the treatment of impetigo.

A stable emulsion of benzyl benzoate is advocated for the treatment of scabies, and it is noted that this would result in a saving of benzyl benzoate, as only one-third of the normal amount is required.

We are indebted to Surgeon Rear-Admiral Sankey for permission to publish this paper.

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ROOT VEGETABLES AS ANTISCORBUTICS IN INFANT FEEDING

BY

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AND

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Any shortage of citrus fruits presents a special problem in the feeding of infants and very young children, especially the former, who cannot obtain their supplies of ascorbic acid to any appreciable extent from potatoes or leaf vegetables. Published work, as summarized in the tables of Fixsen and Roscoe (1938, 1940), indicated that the turnip should be a useful source of ascorbic acid. It was decided to make a preliminary investigation of the root vegetables, turnip (*Brassica rapa*), swede (*Brassica campestris*), and parsnip (*Pastinaca sativa*).* The samples were bought in the open market or picked from crops raised in private gardens from commercial seed in December, 1940, and January, 1941. After our completion of some exploratory work the extensive paper of Chappell (1940) appeared. Our results were in good accord with hers, which were themselves in agreement with those of Olliver (1936, 1940); moreover, the scope of the investigations made by these workers had exceeded ours, so that the separate publication of most of our figures might seem unnecessary. However, the relevant figures published by Olliver and Chappell were concerned with the whole raw vegetables or with the effect of domestic culinary procedure upon the amount of ascorbic acid derivable from them, whereas we were primarily concerned with preparing from the roots something that could be fed direct to the very young; it seems permissible, therefore, to summarize our results and conclusions.

Ways of using Root Vegetables

There are at least three possible ways of using these root vegetables in infant feeding: they will be considered in turn. First, it has occasionally been suggested that the chopped roots should be covered at night with fine sugar, and that any juice separated by next morning could be used as an antiscorbutic. We found that this procedure

* Dr. J. C. Drummond, scientific adviser to the Ministry of Food, expressed interest in the problem, and urged us to look into the matter; the analyses were all carried out by one of us (D. M. M.), with the permission of Mr. A. F. Lerrigo, head of the analytical department of Glaxo Laboratories, Ltd., to whom we wish to express our gratitude.

resulted in negligible extraction of ascorbic acid—about 0.02 mg. per c.cm. (cf. Dr. K. E. Barlow, *Journal*, 1941, **1**, 797). On physico-chemical grounds we had regarded as suspect the apparently almost miraculous properties attributed to sucrose as an extractant of ascorbic acid.

Secondly, the grated vegetables were simply squeezed through muslin ; juices containing 0.30 mg. and 0.32 mg. of ascorbic acid per c.cm. were thus obtained from swedes and turnips respectively. It might, however, be thought by some that such expressed juices would be unfit for infant feeding unless sterilized by boiling ; moreover, the effect on the ascorbic acid content of any ascorbic oxidase present might be significant if the expressed juices were allowed to stand. Boiling would of course destroy any enzymes present. We therefore examined the effect of boiling on the squeezed-out juice. When boiled for periods up to fifteen minutes, and whether brought to the boil slowly or quickly, the juice showed no destruction of ascorbic acid. Prolonged boiling—for thirty minutes or more—sometimes produced slight losses. Exposure to the atmosphere in covered beakers without agitation produced no losses in three to six hours, and up to 25% loss in twenty-four hours ; if, however, the juice was agitated (stirred) periodically the loss was more rapid and might amount to 75% in twenty-four hours. We conclude, therefore, that expressed juice can safely be boiled for a few moments and can be kept (whether unboiled or boiled) for several hours, provided it is covered and not vigorously stirred, without any serious loss of antiscorbutic activity.

Thirdly, the roots can be sliced and boiled with a little water, the cooked mass being then squeezed through muslin into the cooking water. The concentration of ascorbic acid in the resulting liquor will naturally depend on the amount of water used, among other things. Even when this was reduced to a minimum—just enough to cover the vegetables—the liquors were less good sources of ascorbic acid than the cold-pressed juices discussed above. Nevertheless both swede and turnip yielded liquors containing from 5 to 16 mg. of ascorbic acid per 100 c.cm. The comparison between the cold-pressed juices and the cooked liquors must not be carried too far ; different samples of vegetables were used at different times in the year ; and no properly controlled comparison was carried out in this purely preliminary investigation. Our results indicate, however, that cooking, because of the inevitable dilution of the juice and possibly also owing to some destruction, gives a solution of ascorbic acid somewhat less concentrated than the raw or cooked cold-pressed juice, but still a very useful antiscorbutic for use in infant feeding under present conditions.

Source	Author and Reference	Raw (mg. per 100 gm.)	Cooked (mg. per 100 gm. orig. Raw Material)	Cold Pressed Juice (mg. per 100 c.cm.)	Cooked Liquor (mg. per 100 c.cm.)
Turnip	Present	14 to 16	10 to 17	19 to 32	5 to 16
,,	Chappell (1940)	11 to 22	—	—	—
,,	Olliver (1936)	17 to 36	—	—	—
,,	,, (1940)	—	11 to 17	—	—
Swede	Present	20 to 21	16 to 19	30 to 36	5 to 16
,,	Chappell (1940)	21 to 37	—	—	—
,,	Olliver (1941)	30 to 47	19 to 23	—	—
Parsnip	Present	4 to 8	2 to 8	—	—
,,	Chappell (1940)	5 to 6	—	—	—
,,	Olliver (1941)	5 to 9	2 to 4	—	—
Orange*	Bacharach *et al.* (1934)	—	—	36 to 89	—
,,	Chappell (1940)	—	—	27 to 88	—
,,	Olliver (1936)	—	—	33 to 77	—
Black-currants	,, (1936)	172 to 220	141 to 183	—	96 to 122†
	,, (1938)	108 to 344	—	—	—

* Excluding Seville or other bitter oranges.
† Syrup from cooking ; about 50% added water, and fruits not expressed.

Results

As a matter of interest we have summarized in the accompanying table the recent results obtained by Olliver and Chappell, as well as our own, along with some figures for orange juice and blackcurrants. All our determinations were made by titration with 2:6-dichlorophenol-indophenol in the presence of trichloracetic acid.

Parsnips appear to be of no more use than carrots as sources of ascorbic acid. On the other hand, turnip juice or swede juice, cold-pressed, before or after boiling, or the liquors from squeezing the lightly boiled roots, should be of value, especially in infant feeding. Taking the daily requirements of an infant as 5 to 10 mg., then from 1 to 2 fl. oz. of turnip juice or 1/2 to 1 fl. oz. of swede juice each day would suffice. Either of these juices, since they are only slightly acid, can be used to replace the boiled water of a milk feed without causing any curdling, though it imparts to the product a distinct taste and odour of the vegetable, that from the swede also contributing a little colouring matter.

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Medical Memoranda

100 Cases of Scabies : A Comparison of Treatments

To investigate the relative efficiency, speed, cost, and convenience of the various treatments of scabies recently discussed in the *British Medical Journal* I have treated men suffering from this complaint by five different methods :

1. *Sulphur Ointment.*—Sulphur ointment 10% is applied after a hot bath and a scrub in the morning ; another application of the ointment is made in the evening.

2. *Sulphur Ointment and Confection of Sulphur.*—The same as the above, except confectio sulphuris 1 drachm is given once daily (Berncastle, 1941).

3. *Benzyl Benzoate.*—Anoint the body with soft soap. Soak in a hot bath, rubbing the affected areas thoroughly. While the body is still wet apply a lotion consisting of equal parts of benzyl benzoate, industrial spirit, and soft soap (King, 1940) vigorously all over with a nail-brush for five minutes. Allow it to dry, then apply the lotion again for a further five minutes. Dry with a towel.

4. *Rotenone.*—A hot bath is taken and the patient is painted all over with 1% rotenone B.D.H. or 2% rotenone (sarevan) Evans in front of a fire (Caller, 1941).

5. *Derris Root.*—The patient is painted thrice daily with a solution consisting of 4 oz. of derris dusting powder, 18 drachms of soap flakes, and 1 gallon of cold water (Saunders, 1941).

There was no selection of cases apart from the exclusion of those in which the diagnosis was in doubt. Each case was treated by one method only until cured.

The diagnosis was founded on the association of itching when warm with the presence of burrows, which are most profuse in certain areas and there give rise to a red papular rash. A patient was considered cured when the itching had ceased, when there was no sign of activity of the rash (redness, swelling, etc., around the burrows), and when the rash had ceased to spread. It is probable that in this series about five days were wasted by hysterical or wilful "prolongation."

RESULTS AND COST

The time taken to cure 20 cases was: method 1, 46 days ; method 2, 59 days ; method 3, 30 days ; method 4, 38 days ; and method 5, 41 days. I account for the fact that the 20 cases

treated by sulphur ointment took only 46 days as being due to the large number of mild cases in that group.

In assessing the cost, the expense of disinfecting the clothes and blankets is ignored because it varies so much from place to place. The cost of the soft soap for bathing purposes and the soap flakes is also ignored, it being very small. On this basis I calculated that the cost of curing a case by the five methods was: (1) 4.44d.; (2) 6.79d.; (3) 11.25d.; (4) 24d.; (5) 0.25d.

CONCLUSIONS

Benzyl benzoate is the most rapid of the five methods tried. It is clean, but dermatitis results in some cases. Moreover, it is fairly expensive and, at the present time, is difficult to procure.

Diarrhoea is the only appreciable difference that confection of sulphur makes to a man already being treated with sulphur ointment. It has no effect on the time taken to cure him. Sulphur can be counted on to cure the average case in three days. It is reliable and cheap, and only rarely causes dermatitis. The drawback is that it is such a dirty method.

The rotenone preparations, which cure an average case in two days, are clean and convenient but very expensive. In three cases there developed dermatitis of the scrotum following treatment with rotenone; one of these also developed balanitis.

The derris root method is most satisfactory. It is extraordinarily cheap. It is also clean and efficient. There is no necessity for the patient to bathe or to disinfect the clothing he is wearing. I had no case of dermatitis following the use of derris root.

My thanks are due to S.B.P.O. Mellish and Surgeon Captain I. McA. Holmes.

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Convulsions under Anaesthesia

Reports of the occurrence of so-called "ether convulsions" have become very frequent in the last few years, and one of the most anomalous features of this puzzling phenomenon is the apparent fact that, whereas a few anaesthetists or surgeons are able to recount a series of cases, the majority of anaesthetists have yet to meet their first case. The following describes my first experience of this alarming condition in fifteen years of anaesthetic practice, and I hope it will be my last.

CASE REPORT

The patient, an otherwise normal female child aged 10, underwent Steindler's operation upon both feet on June 11 last. Anaesthesia, administered by myself, was smooth and uneventful. The child received premedication with omnopon 1/6 grain and scopolamine 1/300 grain one and a half hours before operation; induction was with nitrous oxide and oxygen, and after "blind" intubation anaesthesia was maintained with vinesthene 25% in ether in closed circuit, using a circle absorber. The child had been anaesthetized previously, at the age of 5, for tonsillectomy, the anaesthetic on that occasion being ethyl chloride followed by open ether. This anaesthesia is reported to have been without incident.

The temperature upon the evening preceding the Steindler operation was 99°; upon the day of operation it was normal. There was intermittent fever, rising to 100°, for two days after the operation; but this subsided, and for the succeeding four days the temperature was normal. On the seventh day pyrexia returned, accompanied by complaint of pain in the right foot. Pyrexia was intermittent, but since the pain persisted it was decided to change the plasters, and on June 25 I was asked to anaesthetize the child for this purpose. The evening temperature on the 24th was 101°, but on the morning of the 25th it was 98.4°. The child was not obviously ill or toxic.

Premedication was again with omnopon 1/6 grain and scopolamine 1/300 grain. Induction with nitrous oxide and oxygen was smooth, and was followed by maintenance with vinesthene 25% in ether in closed circuit with circle absorber. Intubation was omitted, since upon this occasion the prone position was not required. The day was hot and sultry, the theatre temperature, in spite of all available ventilation, being 82°. Within the first fifteen minutes of maintenance the respirations became more vigorous than normal, and it was found that the soda-lime in the absorber had become exhausted; this was therefore renewed. Respiration, however, continued to be unsatisfactory, resolving itself into a series of sudden diaphragmatic contractions resembling hiccup, unwarranted by the plane of anaesthesia (lower first plane), with accompanying slight cyanosis. Rhythmical distension of the lungs by gentle bag compression improved the colour and temporarily allayed the diaphragmatic spasms, but these returned, and were shortly followed by generalized convulsions, with twitching of the facial muscles and intense cyanosis. The nature of the condition now being apparent, I withdrew the anaesthetic, raised the head by placing the table in reverse Trendelenburg, instituted lung inflation with oxygen, and ordered some 10% evipan solution to be prepared and a rectal temperature to be taken. The rectal temperature, taken under great difficulty, was recorded as 103°; the child, however, was extremely hot to the touch, with a dry skin. No improvement in the condition being apparent, I decided to give the evipan. Venepuncture proved to be impossible owing to the absence of visible or palpable veins, and since the condition of the child now appeared to be desperate I gave 4 c.cm. of the evipan intramuscularly into the triceps. The patient was now grey-black, with pupils widely dilated and arrested respiration. I rapidly exposed the larynx, passed an intratracheal catheter, and began insufflation with oxygen. This measure quickly restored the colour. No further convulsions occurred, and the operation, which had revealed a septic condition of the wound of the right foot, was completed, and the legs were re-encased in plaster without additional anaesthetic. No further trouble occurred, and the child left the theatre with normal respirations. Next day she was quite well.

COMMENTARY

Of the usually cited causative factors the following were present in this case: sepsis and possibly some toxaemia; an abnormally hot theatre and sultry weather; raised CO_2 tension for about fifteen minutes, due to exhausted soda-lime; a patient partially covered with mackintosh sheets; the administration of ether. The following factors were absent: the pre-operative administration of atropine; suboxygenation; marked toxaemia.

While the comparative rarity of the occurrence of convulsions under anaesthesia would seem to postulate the need for some subtle and rare combination of factors in their production, it is clear from the cases reported that only two of the factors cited are constantly present—sepsis with toxaemia, and anaesthesia in some form. Of these two factors, since cases have been reported as having occurred under both local and general anaesthesia, which differ widely in the physiology of their actions, it would seem that sepsis with toxaemia is the more constant and must therefore be accorded pride of place in causation; while anaesthesia must be relegated to the role of precipitating factor, possibly through a modification of the stimulus threshold of the nervous system. This would seem to support strongly the postulated neurotoxic origin of the condition.

I have complete confidence in the advisability of administering evipan in this condition, whatever the state of the patient; and from the rapidity and efficacy of its action in this case it would seem that the intramuscular route is as effective as any other, and, if one may dogmatize after such brief experience. I would advise the adoption of this route, since it would seem to be safer in a moribund patient and to afford a longer period of less depressive sedation. As an alternative technique I would suggest a minimal effective dose intravenously, followed after a short interval by the formation of an intramuscular "depot."

CONCLUSIONS

Of all the possible causative factors so far cited only two are constantly present in every case.

Although the convulsions do not necessarily start in the facial muscles, as has been so often stated, there is not the slightest difficulty in recognizing the condition once it has arisen.

Successful treatment consists in the immediate withdrawal of the anaesthetic, the early administration of evipan, intra-

muscularly, intravenously, or by both routes, and the immediate institution of intratracheal insufflation with oxygen.

No anaesthetist should approach a young and febrile patient unless he has the means and the ability to adopt these measures at a moment's notice.

Bournemouth. S. F. DURRANS, M.R.C.S., L.R.C.P., D.A.

Complete Stenosis of Common Bile Duct: Operative Cure

This case is an example of the successful treatment of a condition which is otherwise invariably fatal. It is presented in the hope that it will help to draw attention to the possibility of cure in such cases.

CASE HISTORY

A woman aged 53 was operated on by Mr. Clark at the North Riding Infirmary, Middlesbrough, on May 8, 1939, for gall-stones. An ordinary cholecystectomy was done, but it was noted that the gall-bladder was very adherent to the liver. The common bile duct contained no stones and was not opened. There was no unusual difficulty about the operation, convalescence was normal, and the patient was discharged on July 6, 1939.

Four months later, on November 7, she was readmitted with progressive jaundice and severe pruritus, and on December 5 a second operation was done. The region of the common bile duct was seen to be a mass of dense scar tissue ; the duct itself could not be found in spite of careful dissection. As there seemed no prospect of successful treatment the abdomen was closed. The patient's condition became steadily worse, the itching driving her almost mad, and it was obvious that unless something could be done, and that quickly, she would shortly die. In the meantime Wakeley (1939) had described the successful treatment of such a case by incising the liver and duodenum and stitching a rubber tube in place between them, covering the anastomosis with omentum. It was decided to carry out this procedure.

On February 27, 1940, her abdomen was opened for the third time and the operation described by Wakeley performed. The incision into the lower surface of the liver was deepened by blunt dissection to a depth of 2½ inches, using a pair of artery forceps. The patient recovered well from the operation, but for a week there was no improvement in her jaundice or pruritus. Then quite suddenly she began to pass normal-coloured stools and the itching disappeared. Her jaundice began to improve about the same time, but more slowly. She was discharged on April 23, 1940, with only an icteric tinge, feeling very well. A radiograph at that time showed the tube to be still in position. She occasionally passes clay-coloured stools and has some slight skin irritation, but when last seen at the out-patient department on February 10, 1941, her stools were normal, although she still had an icteric tinge. A radiograph taken on August 12, 1940, showed that the tube had disappeared, presumably having been passed per rectum.

DISCUSSION

One interesting point which arose was whether the incision into the liver should be deepened by sharp or blunt dissection. In this case it was done by the blunt method. I have since been informed by Surgeon Rear-Admiral Wakeley that in his case he dissected down through the liver substance with a scalpel until he found a distended bile duct ; he opened this and inserted the tube. This is not made quite clear in his description of the case. In the present case it seems likely that after a week the rubber tube eroded a distended bile duct in the liver substance, and thus allowed drainage. It is not surprising that this should happen, as in a similar case, not operated on, a bile duct has actually been known to rupture through the diaphragm and open into a bronchus (Miller, 1939). With this in mind blunt dissection would seem to carry less risk of serious haemorrhage.

I am indebted to Mr. J. C. Clark, the surgeon in charge, for permission to publish the case, and also wish to thank Surgeon Rear-Admiral Wakeley for his encouragement to do so.

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Reviews

HISTORY OF PHARMACY

History of Pharmacy. A Guide and a Survey. By Edward Kremers, Ph.D., Sc.D., and George Urdang, D.Sc. (Pp. 466; 30 illustrations. 25s. net.) Philadelphia, London, Montreal: J. B. Lippincott Company. 1941.

This typically encyclopaedic German-American work is stated by the authors to be compiled with particular reference to the needs of students. We can hardly believe that, however useful it may be as a book of reference, students can or ought to try to assimilate such a mass of detail. The opening chapters on early backgrounds and medical theories are, however, of real general interest. They are followed by sections dealing with the rise of professional pharmacy in different European countries, and here we detect a mildly patronizing attitude towards England. Nearly half the book is devoted to a minutely documented account of pharmacy in the United States in all its bearings. A bibliography, chronology, and glossary complete this monument of laborious industry.

Certain general conclusions emerge. The authors believe that from the very beginning attempts at rational therapeutics went hand in hand with purely magical procedures. Secondly, it appears that the repeated attempts of the physician to control the pharmacist have not always favoured the scientific advance of pharmacy. It is interesting to learn that the Emperor Frederick II, that extraordinarily modern-minded man, issued an edict in 1240 separating the pharmaceutical from the medical profession. In this country the Society of Apothecaries had in 1617 to emancipate themselves from the physicians on the one hand and the grocers on the other. Then the apothecaries claimed to be practitioners of medicine, and to protect the interests of pharmacy the Pharmaceutical Society was founded just a century ago. Even so the struggle continues between the doctor who dispenses and the chemist who prescribes. Fortunately, a *modus vivendi* between the two professions concerning the *British Pharmacopoeia* and many other matters has been achieved.

The third point is that, although an increasingly high standard of education is demanded of the pharmacist, his privileges stand in danger of serious curtailment through the increasing power of the co-operative societies and patent medicine vendors, on both of whom the legislature casts a curiously protective eye, not to mention the wholesale chemist who sends out remedies all ready to be handed over the counter by a highly trained dispenser. The moral of the history of pharmacy is that if its professional status is not safeguarded the whole technique of healing suffers.

ENCYCLOPAEDIA OF MEDICAL PRACTICE

The British Encyclopaedia of Medical Practice, including Medicine, Surgery, Obstetrics, Gynaecology, and Other Special Subjects. Under the general editorship of Sir Humphry Rolleston, Bt., G.C.V.O., M.D. Publishing Editor, Adam Clark, L.M.S.S.A.; Sub-editor, G. Faulkner, D.Sc. *Surveys and Abstracts* and *Cumulative Supplement, 1940.* (Pp. 956, and pp. 283. No price given.) London: Butterworth and Co. (Publishers) Ltd.

Continuing to fulfil the plan originally adopted for the *British Encyclopaedia of Medical Practice*, the editors have brought out the 1940 volumes of *Surveys and Abstracts* and of the *Cumulative Supplement* in spite of wartime conditions. These keep the high standard previously remarked on. Though naturally influenced by both war problems and war needs, the contributors take a broad-minded view of the subjects under comment and again set out an up-to-date review of the matter. In the past few years two

advances in medicine have followed the elaborate and often apparently academic researches of the biochemists, and now the medical practitioner is reaping the benefit of all this work in finding great help in diagnosis from the use of chemical tests, and in treatment from the use of the sulphonamide compounds and the sex hormones. All these are now sufficiently established to have clear indications for their administration and something like reliable standards of efficacy.

The *Cumulative Supplement* is meant to elaborate and add to the information already available in the main body of the *Encyclopaedia*. With the new *Index* it is possible to find one's way to the discussion of the particular subject sought. The *Index* has been produced with the help of those accustomed to the control and running of medical libraries, and we find on testing that it enables a quick and satisfactory reference to the required information to be made.

In the volume of *Surveys and Abstracts* the editors have invited leaders in the various subjects discussed to give a summary of recent work. These articles give, therefore, digested reviews of the present aspects of medicine, surgery, and obstetrics, with special discussions of many of the systemic diseases, and most useful surveys of radiography and radiotherapy, chemical pathology, anaesthetics, and recent developments in drug therapy. The abstracts are remarkable for the breadth and variety of references to current medical literature from the medical profession of the world. In these times of stress and lessened supply the publishers have kept up the standard of production, so that the present volumes align themselves with those already printed before the war.

INTRODUCTION TO PHYSIOLOGY AND ANATOMY

Physiology and Anatomy. By Esther M. Greisheimer, M.A., Ph.D., M.D. Fourth edition. (Pp. 822; 474 illustrations, of which 52 are in colour. 18s. net.) Philadelphia, London, Montreal: J. B. Lippincott Company.

The popularity of this book is well attested by its having reached, since June, 1932, a fourth edition, and by the fact that reprints of all the earlier editions have been required. The subject-matter has been now arranged on what is termed the "unit plan," and the wide scope of the work is indicated by the headings of these units: (1) "The Body as an Integrated Whole"; (2) "The Erect and Moving Body"; (3) "Integration and Control of the Body by the Nervous System"; (4) "Maintaining the Metabolism of the Body"; (5) "The Reproductive System." The last includes an "Introduction to Embryology" and notes on pregnancy and parturition. The description of each subject is followed by brief allusions to practical considerations, and by a summary. The book is amply and well illustrated, the figures including some excellent *x*-ray photographs, and some useful schemes and tables which summarize recent work on such subjects as water balance, digestion, and the ovulatory cycle.

It may be freely admitted that the present work "reflects the most recent trends and concepts in the teaching of physiology and anatomy." One of these trends is greater attention than heretofore to the study of the physico-chemical side of physiology, which is all to the good. Other tendencies are, however, to reduce the period allotted for the study of anatomy and embryology. This trend has now moved so far that the description of individual muscles or the complete development of particular organs or parts is replaced by schematic tables or general statements which are wholly inadequate for the proper comprehension of these subjects from the standpoint of a medical practitioner. Dr. Greisheimer's book presumably fulfils the requirements of the modern school of thought, and apart from the above comments the author is to be congratulated on the amount of useful information she has succeeded in putting before the reader in an attractive and interesting manner. From the physiological aspect the book should prove valuable not only to students training for the nursing profession but also to teachers of elementary applied or clinical physiology.

Notes on Books

We have received from Moscow, after three months in transit, a copy of a small book, *Health Resorts of the U.S.S.R.*, being a group of illustrated articles compiled from data in the Central Institute of Balneology under the editorship of Dr. I. A. PERTSOV. In his preface Prof. I. A. Valedinsky brings to light the boundless resources for the development of health resorts in the Union of Soviet Socialist Republics. "Innumerable and varied mineral springs and deposits of medicinal muds, peats, etc., are to be found literally throughout the whole of the Soviet Union." The numerous health resorts are recognized as forming part of the national wealth, and their development has proceeded according to the general State plan. Spa treatment also comprises one of the links in a chain of medico-prophylactic measures for improving the health of the working population of Russia. The book is published by the U.S.S.R. Society for Cultural Relations with Foreign Countries (Bolshaya Gruzinskaya, 17, Moscow, 56). Not many copies are likely to reach this country just now, but those that do will be read with particular interest by balneologists and climatologists.

Preparations and Appliances

TRANSFUSION PANNIER

A transfusion equipment with some special features of interest is now in use in the hospital and ambulance service of the Australian Army. Although not on sale in this country, it is on exhibition by Drug Houses of Australia Export Ltd., Australia House, London, W.C.2, and there are hopes that in course of time it may become standard British equipment. In designing the apparatus, which bears the trade name of "Soluvac," assistance has been given by the Walter and Eliza Hall Institute of Medical Research, Melbourne.

The pannier in which the whole equipment is contained is a masterpiece of packing. For use in the field it is made of cane, covered with canvas, and it contains four litres of 5% dextrose in normal saline, a similar quantity in Ringer's solution, and two litres of normal saline, making ten litres of fluid suitable for intravenous administration, all vacuum-packed in screw-top flasks. There are also five sets for giving these solutions, each set comprising 5 feet of rubber tubing with clamp and dropper, and two glass cannulae with one No. 17 needle for alternative use. Five blood filters for addition to these sets when giving stored blood or blood containing clots are provided. There are two sets for collecting blood from donors. Each set comprises a sterilized bottle, stopper, two spare needles, air filter, 18 inches of rubber tubing fitted at each end with a blood needle of large bore, and a number of ampoules of anti-coagulant solution. Special attention is called to the design of the bottles and the method of closure. The bottle is graduated from both top and bottom and is of one-litre capacity. A metal bail fitted to the base enables it to be hung up by string or hook during delivery of contents. The bottle is closed by a rubber stopper pierced by two holes, one hole accommodating an air-inlet tube and the other being vacant. The stopper is covered by a rubber disk and this in turn by a metal disk, with elaborate precautions for accurate fitting, so that a hole in the disks exactly overlies the vacant hole in the stopper. Both disks are held in position by a metal collar, which screws on to the bottle neck.

The pannier also contains sets for grouping blood, various accessories and spare and alternative parts, and a useful feature of it is that every item is in a box carrying a plainly marked inventory label and showing also how many items of the same kind are included.

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TREATMENT BY HYPOTHERMIA

About two years ago Prof. Temple Fay and Dr. Lawrence Smith of Philadelphia issued their first clinical report on the effects upon cancer growth of a general lowering of the body temperature by about 10° F. They termed this general depression of body temperature "hibernation," while local cooling of a tumour was called "refrigeration." This earlier work has already been reviewed in our columns.[1] A group of workers at the Lenox Hill Hospital, New York, reinvestigated[2] the effects of this method of general cooling, but called it "crymotherapy." A third careful research has appeared under the authorship of Dr. J. H. Talbot[3] of Boston, and he has introduced the term "hypothermia," which on the whole seems more satisfactory and comprehensive than any of the other terms. He has reviewed the literature and points out that the local application of cold for treatment of cancer dates back as early as 1865. Recent studies have shown that regressive changes in tumours are most obvious when local hypothermia can be carried out at a temperature between 40° and 50° F. Special fitting coils through which a refrigerant circulates are applied and necrosis of tumour tissue may follow. Dr. A. McCravey[4] has reported favourable results with local hypothermia in five cases of carcinoma of the bladder in which the bladder cavity had been marsupialized and exteriorized. In all cases the patient's life was prolonged beyond that expected for a patient not treated with hypothermia. It is possible that radiation combined with cold might be more effective than either alone, as the effects of cold upon the tumour cells are not so unlike those of radiation with *x* rays. Talbot emphasizes that hypothermia is not looked on as a cure for cancer by even the most sanguine of its advocates, yet it does have a place in the treatment of a selected group of patients suffering from this disease. The Lenox Hill Hospital authorities publish a list of cases which are unsuitable for treatment by general hypothermia ; it needs more careful consideration than does the local therapy.

Contrary to what has been taught hitherto, the lowest internal temperature that man can bear probably lies somewhere between 70° and 75° and not between 90° and 95° F. Two patients of Talbot and his colleague Tillotson had rectal temperatures of 74° and 75° F. respectively, and both made an uneventful recovery from this cooling. The heat regulatory mechanism presumably ceases to operate below 75° F. in animals, and the continued fall in body temperature proceeds at the same rate as that in a dead animal in similar circumstances. If the animal is then warmed the thermal regulatory mechanism begins to assert itself at approximately 75° F. In the hibernating animal the body temperature may approach 32° F. without causing death.

For induction of general hypothermia Talbot recommends three or more grains of nembutal intramuscularly twenty minutes before the patient is placed nude in the cold environment at 32° F. Just before the cooling 0.5 to 0.7 gramme of evipan is given intravenously. Within an hour the anaesthetic effect of evipan has worn off and simultaneously the body temperature falls. The anaesthetic property of the cold usually obviates the necessity for further intravenous anaesthesia or sedative. By keeping the environmental temperature below 60° F. a working range for internal temperature (controlled by rectal thermocouple) between 80° and 90° F. is maintained for not more than twenty-four hours in the trial period of treatment. This trial period is especially necessary for patients older than 40 or who have metastatic cancer. Following the initial treatment there may be one or more additional periods of from two to four days each, while the intervals between successive treatments may be as short as two or three weeks. It is not known how many times the treatment may be repeated. A gradual restoration of body temperature at a rate not higher than 2° F. an hour is associated with fewer ominous signs than a rapid rise. No serious after-effects have been observed, but the development of pneumonia in patients with metastatic cancer in the lungs is sufficiently common to cause rejection of such patients for treatment. During hypothermia there are various changes such as initial rise of pulse and blood pressure followed by a gradual fall, obliteration of venous channels, constriction of large arteries but no vascular occlusion or thrombosis, prolongation of circulation time from arm to leg, disappearance of pupillary reflexes, cardiac arrhythmias such as sinus arrhythmia and auricular fibrillation. All Talbot's patients whose temperature reached 80° F. developed fibrillation, which was corrected by digitalis, quinidine, and restoration of body temperature. Unless fluid balance is maintained there is haemoconcentration with an increase (25%) in the red cell count. The white cell count increases several-fold with a rise in the percentage of polymorphonuclear cells. Routine urine analyses for albumin, sugar, and formed elements were negative.

The principal conditions treated up to the time of Talbot's publication were intractable pain, cancer, morphine addiction, leukaemia, and schizophrenia. Relief of pain may well be the most important gain, and all observers are in agreement concerning this ; two-thirds of the patients treated had much relief. Some have found that sedatives, narcotics, and operative intervention (chordotomy and rhizotomy) for pain are no longer necessary. Morphine addiction *per se* has responded to general hypothermia, and the use of cold in diminishing the undesirable effects of alcoholic intoxication has been appreciated for at least 150 years. Talbot refers to a gentleman named Weeks who lived about that time back and was a great votary of Bacchus. For fifteen or twenty years he was in the habit of plunging into cold water when he rose from his bottle and of actually going to sleep in a trough full of water with his head

[1] *British Medical Journal*, 1940, **1**, 979.
[2] See *British Medical Journal*, 1940, **2**, 528.
[3] *New Engl. J. Med.*, 1941, **224**, 281.
[4] *N.Y. St. J. Med.*, 1940, **40**, 1435.

specially supported. Instead of experiencing debility, lassitude, headache, and nausea, he found himself on awaking cheerful, refreshed, and free from all effects of intoxication.

The value of greatly reduced temperatures in other fields of surgery is also being studied by Dr. F. M. Allen of New York and others. Fundamental investigations are being very carefully conducted in order that undue enthusiasm over a spectacular novelty may not be followed by disillusionment, which may obscure any real value of the method. Dr. Allen[5] introduces the use of the tourniquet with low temperature and gives some data of amputations through the thigh and the lower leg for diabetic gangrene and arteriosclerotic gangrene in aged patients; anaesthesia is produced by keeping the bloodless leg tissues for a period of from one to five hours at a temperature of about 5° C. by means of ice-bags or iced water. The leg is rendered bloodless before cooling by careful application of a narrow tourniquet after elevation of the leg to drain off any non-infected blood. The use of cold makes it possible to disregard the rule that a tourniquet must not be applied to a diabetic or arteriosclerotic limb. The tourniquet is released after the operation, when all is in readiness for closure of the wound. It appears that both primary and secondary shock are abolished by suitably low temperature in the damaged tissue, and the surgeon has the opportunity of working in a bloodless and shockless field; the low temperature inhibits growth of bacteria. Loss of vitality in wound flaps or mutilated tissue is also treated by local reduction of temperature, as is post-operative shock. Healing is slowed down but not stopped by low temperature. Attention is also being directed towards the possible use of hypothermia in military surgery and in embolism and other accidents. Embolism of a main artery is one of the conditions in which warming a limb is disastrous, and Dr. Allen believes that a suitable degree of refrigeration may be the most important non-operative treatment. At a temperature of 5° C. the requirements of the tissues for oxygen are reduced, and in intact animals the period of survival of the bloodless limb tissues has been experimentally increased at least to fifty-four hours as against the few hours or minutes at higher temperatures. Dr. Allen has attempted to apply this finding to surgery, but at present his researches are at a preliminary stage.

LEUCODERMA FROM RUBBER GLOVES

Although from time to time cases of dermatitis occur which can be attributed to the wearing of rubber gloves, they are, on the whole, rare considering the nature of the complex substances, organic and inorganic, commonly used in the preparation of rubber. A recent report[6] by Schwartz and Oliver of an occupational leucoderma, due to an ingredient in the rubber of the gloves they wore, among negro and white workers in tanneries in the U.S.A. is therefore of interest. The report provides a model of how an investigation into dermatitis should be carried out, and on this ground alone is worth detailed consideration. Workers in tanneries are subject to skin and nail affections due to tannin, sulphides, lime and chrome salts, and also to bacterial infection of the skin, but this leucoderma was something new. The condition was preceded by itching and mild dermatitis in some cases, but there was no great discomfort or disability. Localization of the lesion to the hands quickly led to an investigation of the gloves, which were identified by the manufacturers as "acid-cured" gloves in which the rubber mix had recently been modified by the addition of 0.2% of an anti-oxidant not previously used. This anti-oxidant was the monobenzyl ether of hydroquinone, which, as used, is a tan-coloured light powder with an aromatic odour, a specific gravity of 1.26, and a melting range of 115° to 120°C. It is very slightly soluble in water and benzol and in rubber to 2%; it is said to be non-toxic with ordinary handling, and it does not "bloom" when used up to 1% in rubber. As it does not discolour in daylight and only slightly in direct sunlight, it was recommended for use in white and light-coloured rubber goods. Further, it is not as readily attacked as other anti-oxidants by acid-cure (sulphur monochloride). The incidence of the leucoderma among the Mexicans, negroes, and white Americans wearing these gloves was respectively 31%, 29%, and 21%. In the negroes the areas of depigmented skin were a flat white, but in the white workers the leucoderma showed only in the summer, when the skin of the glove areas failed to tan. In no case were the hairs bleached.

A comprehensive series of patch tests of all the various constituents, including the acid-cured rubber which did not contain the anti-oxidant, the dimethylamine used by one tannery as a de-hairing agent, and the various tanning liquors, were carried out. All the workers reacted to the anti-oxidant patch with greater or less degrees of leucoderma, and only one reacted to a piece of acid-cured rubber containing a mere trace of the anti-oxidant; none of the remaining constituents of the rubber gave leucodermic reactions. The patches were allowed to remain in contact with the skin for seven days; the leucoderma appeared on five of the ten patients tested two weeks after the patches were applied; six months later three more showed leucoderma, and two of the first five were now repigmented. In the majority of cases leucoderma began to develop about a week after the patches were removed. There was skin reaction and leucoderma after only seventy-two hours' application of the anti-oxidant either alone or in unvulcanized or vulcanized rubber. Hydroquinone (1% of which was present in the original anti-oxidant) failed, even in strong concentration, to cause leucoderma. Subjects who had had no previous contact with the anti-oxidant developed leucoderma some months after application of the patches. It would thus appear that this anti-oxidant leads, after a considerable time, to depigmentation of the skin but not of the hairs, and whatever the mechanism may be, the oxidase system responsible for the development of pigment in the skin is not permanently damaged, for repigmentation gradually occurs if there is no further contact with the anti-oxidant.

[5] *Amer. J. Surg.*, 1941, **52**, 225.
[6] *Publ. Hlth. Rep.*, Wash., 1940, **55**, 1111

The histology of the depigmented and repigmented skin was studied, the "dopa" staining method and the usual haematoxylin-eosin technique being used. This showed a fairly sharp line of demarcation between the normal and leucodermic areas of skin, with a gradual decrease in pigment particles in the cells of the basal layer as this was approached. The process of repigmentation could be seen in action by the presence in the basal cells of "dopa" positive particles interspersed among areas of pigment-free cells. No inflammatory reaction in the skin was noted, nor were the pigment cells morphologically affected. The mechanism by which this action of the monobenzyl ether of hydroquinone is brought about is not certain. Schwartz and Oliver consider that anti-oxidants act by their greater affinity for oxygen, thus, for a time at least, inhibiting the action of oxygen on the rubber. The formation of melanin in the skin is a complicated process, but in simple terms it may be described as the oxidation of 3.4 dihydroxyphenylalanine (dopa reagent) to melanin by an oxidizing enzyme in the melanoblasts of the epidermis. Whether the precursor of melanin in the skin is identical with dopa is not clear, but at any rate the two must be closely related. The localization of dopa oxidase, as the enzyme is called, to the melanoblasts is demonstrated by fixing skin sections in formol and treating them for a few hours to a few days with 0.1% dopa buffered to *p*H 7.3 or 7.4. The cells containing the oxidase will thus be stained deeply with melanin. Before a leucoderma is produced the existing pigment must disappear and new pigment must be prevented from forming. The former was seen to be the result not of bleaching of the existing pigment but of a slow metabolic removal; the second may be brought about by deflecting oxygen from the substrate, by inactivation of the oxidase, or by preventing the formation of the pigment precursor. It is not clear which of these or what combination of them is the true explanation, but from the fact that the "dopa" reaction was negative in the leucodermic areas it follows that the oxidase system was not operative. On the other hand, the fact that repigmentation was slowly re-established shows that the inhibiting factor (presumably the anti-oxidant) gradually disappeared and allowed the oxidase system to operate normally. It seems, therefore, that the action of the monobenzyl ether of hydroquinone in the skin is similar to its action in rubber—that is, it prevents the oxidation of the unsaturated linkages in the rubber molecule and the oxidation of the pro-pigment (dopa) in the skin.

OBSCURE PULMONARY INFECTIONS

The pitfalls that beset the diagnosis of pulmonary tuberculosis in the absence of bacteriological confirmation have been enumerated by Scadding,[1] and they are rendered prominent at the present time by an unfortunate tendency in the Services to board a man out with the diagnosis of pulmonary tuberculosis solely on the evidence of a radiological opacity. In a recent paper Davidson and Ellman[2] described five patients all of whom had radiological lesions in the lungs which pursued a benign course. The authors hold the opinion that these were examples of so-called "benign acute pulmonary tuberculosis," as described by Ornstein, Ulmar, and Dittler,[3] though in no instance did the sputum contain tubercle bacilli. Many physicians would probably disagree with this diagnosis in some, at least, of the published examples, but the paper is of value because it directs attention to the difficulty of distinguishing between pulmonary tuberculosis and the various atypical forms of pneumonia. A certain amount of confusion has been caused by the indiscriminate use of the term "pneumonitis" to cover a variety of conditions, but Scadding, in a series of articles, has shown that the common forms of atypical pneumonia can be classified conveniently into four groups. The first is described as benign circumscribed pneumonia,[4] a transient localized consolidation arising in the course of a catarrhal infection of the respiratory tract. This condition is of frequent occurrence, it produces few symptoms, and is commonly found on routine radiological examination. The second form is chronic suppurative pneumonia,[5] a condition characterized by prolonged pulmonary consolidation and a tendency to abscess formation; the disease may spread, either directly or by aspiration, and when healing occurs it is accompanied by fibrosis. The sputum is purulent and may be offensive, and the patient shows obvious signs of toxaemia. In the third type—chronic diffuse bronchopneumonia[6]—there is a widespread, patchy consolidation of the lungs with fibrosis, the radiographical picture closely resembling that of chronic fibroid tuberculosis; the patient is gravely ill, dyspnoea is the most prominent symptom, and the disease pursues a prolonged but fatal course. The fourth form Scadding describes as disseminated focal pneumonia,[7] an acute condition not associated with upper respiratory tract infection in which fever, sweating, cough, and, later, sputum are the principal features. Radiologically there is a mottling similar to that seen in miliary tuberculosis, though less widespread, and both the symptoms and radiological lesions disappear in the course of a few weeks.

The aetiology of these infections remains obscure. The sputum commonly shows a mixed flora with no organism predominating. It is probable that the first three conditions are due to the aspiration of infected material into the terminal parts of the bronchial tree, while the recent work of Weir and Horsfall[8] suggests that disseminated focal pneumonia is a virus infection. An epidemic of atypical pneumonia in infants, probably due to a virus, has been described recently by Adams.[9] When faced with the need to distinguish between one of these conditions and pulmonary tuberculosis the physician's lot is not a happy one. On the one hand he is in danger of failing to diagnose an early case of pulmonary tuberculosis, while on the other there is the risk of imprinting the stigma of that disease upon an innocent subject. Every recognized aid to diagnosis should be employed. A strong family history of tuberculosis may be a deciding factor. The sputum should be cultured and injected into a guinea-pig whenever possible, and when none is being expectorated it is often possible to obtain a specimen through the bronchoscope. But every investigation may well prove negative or inconclusive, and the search has to be relinquished until the disease either reveals its nature in its own time or remains a mystery. There is a need for new ways of approach to this problem, and the method of diagnostic lung puncture may deserve a more extensive trial.

[1] *Tubercle*, 1939, **21**, 1.
[2] *Brit. J. Tuberc.*, 1941, **35**, 5.
[3] *Amer. Rev. Tuberc.*, 1931, **23**, 223.
[4] *Quart. J. Med.*, 1939, **8**, 79.
[5] *Proc. roy. Soc. Med.*, 1938, **31**, 1259.
[6] *Brit. J. Tuberc.*, 1936, **30**, 186.
[7] *British Medical Journal*, 1937, **2**, 956.
[8] *J. exp. Med.*, 1940, **72**, 595.
[9] *J. Amer. med. Ass.*, 1941, **116**, 925.

TRAFFIC OFFENDERS

Driving a motor vehicle is an act that calls for a sense of social responsibility and for physical fitness to perform it. Many diseases and disabilities are incompatible with safe driving, yet in this country epilepsy is almost the only one, apart from blindness, which is generally recognized as a bar to the driver's seat. Among one hundred traffic offenders referred for medical examination by the Recorder's Court in Detroit, there were fourteen with evident neurological disease, four with well-developed mental disease, and fifty-eight, including four epileptics, with isolated neurological signs; these results were compared with a control group, of whom only twenty-two gave similar findings.[1] The persons observed had been chosen by the judge for medical investigation because of the impression they gave the court when they were in the box; so that the grosser medical conditions at least were presented in far higher proportion than among traffic offenders in general. Though only one-quarter of 1% of all the cases passing through the court were referred, the fact that the sample taken shows nearly 20% of seriously disabling disease proves the desirability of some medical supervision for holders of driving licences. The rising figures for deaths on the road in this country will, we hope, persuade the authorities that action of this kind is necessary. A medical certificate of fitness accompanying each application for a licence should be as obligatory as the passing of a driving test. Such a certificate should, on the analogy of a passport, be signed only by a doctor who has known the candidate for some time, because there are mental conditions of great importance in this respect which may not show themselves at formal clinical examination. There is, for example, addiction to alcohol, of which there were fifteen cases in the Detroit investigation. There are also other forms of irresponsible psychopathy—"sociopathy," as it is sometimes called. A well-planned system would provide for a yearly medical examination. This need not cost the State much because, except in the case of paid drivers, it should be charged to the applicant himself. Failing such a comprehensive measure there should at least be a medical examination of all those convicted of careless or dangerous driving, whether merely of speeding, of intoxication while driving, or of actual manslaughter. There are states of mind other than those characteristic of psychoses which should be a bar to driving but which no routine medical examination could eliminate. There are people who desire power and want to overtake everyone on the road, the aggressive who would like everyone else to get out of their way, the anxiously preoccupied whose attention is only half on the driving, the depressed who contemplate a car accident as a means of suicide, the guilt-ridden whose legs fail when they seek to apply the brakes. Few such are likely to be detected until an accident has happened, if then. On the other hand, it is surprising how comparatively few car accidents occur to psychoneurotics, or even to those who are profoundly depressed constitutionally. It has, however, been shown that even in minor road accidents psychiatric investigation is worth while. Some years ago an investigation was carried out on New York bus drivers who had had more than the average number of accidents. The results showed that they were usually people who, at the time, had domestic or financial cares on their minds. It is impossible for any scheme, however perfect, to eliminate all accidents from such causes. But a good system of licensing should demand not simply an affidavit from the applicant of freedom from disease or disabling defect, but a medical overhaul at least at the time of first application and, say, every five years thereafter, together with a statutory medical examination if any serious traffic offence is committed. Tests of driving aptitude—a cognate problem—have not so far proved themselves enough to make it worth while to apply them to the ordinary candidate for a licence.

[1] *Psychosomatic Med.*, 1940, **2**, 384.

PREVENTION OF DIABETES

Prevention of such a condition as human diabetes must depend upon some degree of certainty as to its causation. What, in fact, do we know of the cause of diabetes in man? In spite of the vast amount of work done on the subject both before and since the discovery of insulin, we know little. The fact that insulin can, and in most cases does, control the condition in greater or less measure means that manufacture in the body has ceased, or that insufficient amounts are available, or that what is produced by the islets is inactive, inactivated, or antagonized. The last possibility must be kept in mind in view of the paucity in many cases of pathological signs in the pancreas. But the success of insulin does not help us to understand why an apparently normal young man suddenly finds that he is losing weight and energy, is always thirsty and hungry, and has to get up at night to micturate. From being a normal, active person he has more or less suddenly become a diabetic. Why? The practitioner, having established the diagnosis in the usual ways, inquires closely into the family history, dietary habits in the matter of carbohydrate, and the rest. Family histories of significance are frequent enough to justify the conclusion that a tendency existed in the patient's forebears; but this is far from saying that the condition is hereditary. Any system of prevention which would involve application to all members of families related more or less closely to groups in which diabetes had occurred would in most cases be a waste of time and effort. A history of excessive consumption of soluble carbohydrate is often obtained, but not often enough for it to be regarded as an essential factor in causation. People with diabetes are met with who have had a lifelong aversion from soluble carbohydrates, and big eaters of sugar remain perfectly free from glycosuria throughout life. A history of high nervous tension is common, but so is a history of phlegmatic temperament. Obesity is not infrequently a precursor of diabetes, which may be of the fulminating type or of the so-called hepatic type. Diabetes is met with in children long before dietary indiscretions are likely to have had any serious effect in exhausting the production of the islets. That diet may have something to do with the onset of the disease was suggested by the fall in incidence which is said to have occurred in Germany during the last war. But diabetes appears among people who have never possessed enough means to do more than live on the borderline of starvation. It must be kept in mind, however, that such people tend to feed largely on carbohydrate foods.

Failing any clear knowledge of the primary cause of human diabetes, Best and his co-workers[1] propose that children with a family history of diabetes should have their blood sugars determined at frequent intervals, with a view to early diagnosis and treatment. They further suggest that measures should be taken to rest the islet tissue by either dietary means or insulin, or both. It is held that in the early stages of the disease rest of the islet tissue will allow of some recovery of the already affected cells, or that it will at any rate spare those not yet involved. In experimental animals the criterion of functional rest to the islet tissue is taken to be a marked diminution of the insulin content of the pancreas, and it was shown conclusively that starvation, starvation with insulin administration, and

[1] *New Engl. J. Med.*, 1940, **223**, 607.

a fat diet with or without insulin all produced such diminution in a high degree. Leaving aside the theoretical soundness of Best's interpretation of his findings, let us consider the fate to which he would sentence thousands of children unfortunate enough to have been born into families in which there had been a case of diabetes or glycosuria. Such children would be brought up with the sugar menace always over their heads, with a diet which would make eating an unpleasant task, with the hospital or doctor constantly on their track, and, as they grew up, with rebellion and resentment in their hearts. But such rebellion would be of little avail, for no one could be certain that the inborn tendency to diabetes would not manifest itself at any time if the regime were discontinued. It might even be argued that life as a diabetic would be preferable in that at least the patient would know where he stood and could get a square meal when he wanted it. Further, as pointed out by Lawrence, a diet low in carbohydrate and protein, combined with systematic dosage of insulin, would give the "potential diabetic" all the apprehensions of the unstabilized diabetic about his next attack of hypoglycaemia. The prevention of diabetes must surely lie in the social, physical, and mental improvement of man, and in the re-ordering of his activities. Spontaneous diabetes in animals, at least in laboratory animals, is a rare phenomenon. The relation of carbohydrate metabolism and the function of the islets to brain centres and the pituitary gland is established. Is it too much to suppose that this disease is in some fundamental way one of the prices which man is paying for his departure from the most elementary principles of his constitution? Cases of acute diabetes occur as the result of violent emotional crises or fear. Harassed and torn by wars and horrors, mankind has denied itself or been denied the possible compensation afforded by a healthful life in the periods between conflicts. In peace his anxieties are often scarcely less disturbing. These anxieties on different planes affect all classes, rich and poor. It is at least plausible to associate the high incidence of diabetes among Jews with the many centuries of persecution to which they have been subjected, and the maintenance of the high incidence in regions where persecution has not been practised for some generations to the inherited nervous instability which resulted.

THE TEACHING OF MOTHERCRAFT

For several years the National Association of Maternity and Child Welfare Centres and for the Prevention of Infant Mortality has been concerned with the organized teaching of mothercraft on a national basis. At a recent discussion of the Maternity and Child Welfare Group of the Society of Medical Officers of Health the subject was fully ventilated by Dr. Leslie Housden[1] and Dr. Agnes Nicoll.[2] They clearly brought out that workers in maternity and child welfare centres are hampered by coming into contact with the mothers too late, when wrong habits have already been formed because of ignorance of even the most elementary principles of child hygiene. The problem has three main difficulties: first, at what stage of the school curriculum should mothercraft be introduced? This is relatively easy to answer, for obviously the last two years of elementary school life must be the time of choice until secondary schooling is universal. (The National Association, mentioned above, issues a syllabus of theoretical and practical instruction for girls under 16.) More difficult is the question of who is to do the teaching. Clearly a married schoolmistress with a family of her own and herself educated by a special course of training for the purpose would be ideal. But local education authorities, at all events in times of peace, have a habit of dismissing married teachers, so the speakers at the discussion favoured the choice of a health visitor accustomed to teaching. The choice will have to be made most carefully; the type of instruction for schoolgirls needs, for example, to be different from that for young mothers at an ante-natal clinic. There is also the inevitable question of finance, for the teachers must be paid, and it is necessary to have a certain amount of apparatus, charts, and so forth. Here Dr. Housden was on certain ground when he stated dogmatically that the more a mother knows about the care of her children the less they will cost the State. A reduced expenditure on children's hospitals, juvenile courts, approved schools, and even prisons would eventually result from a national policy of educating all girls for home-making and mothercraft. Many girls now leave school with a good grounding in needlework and cooking and perhaps with some instruction in housecraft, but the care of children is sadly neglected. School is the only place where every potential mother of the future can be reached, and the teaching of mothercraft as an essential part of the school curriculum is a practical contribution to the health of the nation. Incidentally the Maternity and Child Welfare Group of the Society of Medical Officers of Health must be congratulated on turning their attention to the future at a time when wartime duties and temporary arrangements might well have absorbed their energy.

[1] *Publ. Hlth.*, 1941, **54**, 163.
[2] Ibid., 166.

LONDON HOSPITAL ENTERS ITS THIRD CENTURY

This year the London Hospital enters its third century. It was in 1741 that, after a meeting held in a City tavern towards the end of the previous year, when it was decided to rent a house in Featherstone Street, patients were admitted, a banking account opened, a house committee elected, and a woman engaged to act as nurse (at a salary of £14 per annum). A chaplain was also appointed in 1741, and held office for nearly fifty years, and in 1741 the first medical student was entered—a Mr. Godfrey Webb, pupil to the first surgeon, Mr. John Harrison. After being in the hospital six months Webb succeeded in obtaining the post of apothecary, and the polite letter he wrote in that connexion, a masterpiece of flourishes, has just been discovered. To-day the London Hospital is the largest in the Metropolis (though not in Great Britain), with a roof space of ten acres, a total area equal to twice that of Trafalgar Square, and normally bed accommodation for 900. Under war conditions the building in Whitechapel maintains only 360 beds, of which 160 are reserved for air-raid casualties, but it has an annexe at Brentwood with 252 beds, which will eventually be increased to 360 when the nurses' accommodation is completed. Since the air raids started the London Hospital has received direct hits—some of them on the first "blitz" night—it has had many incendiaries, and has lost 3,500 windows. But except for the temporary stoppage of such services as lighting and power, it has never been put out of action. Damage has been done to the nurses' homes, the laundry, and the out-patient department, but not to the wards. They tell at the "London" the same story as is told at all the other hospitals—of the conspicuous devotion of the staff, medical, nursing, and administrative.

A special meeting of Representatives of Home Divisions of the British Medical Association will be held at B.M.A. House, Tavistock Square, W.C., on Thursday, September 11, at 12 noon, and will continue on the following day. The Executive Committee will meet at 10 a.m. and the Council at 11 a.m. on September 11.

SYSTEMIC FACTORS INFLUENCING WOUND HEALING

BY

W. GRANT WAUGH, M.D., F.R.C.S.

Surgeons who were actively engaged in the treatment of the wounded in the war of 1914-18 may legitimately inquire how far and in what manner advance in the treatment of wounds has been made. It would appear that progress has been chiefly in the direction of the inhibition or reduction of infection by the universal recognition of the virtue of early incision, appropriate secondary suture, immobilization by closed-plaster or other technique, and the employment of a chemotherapeutic agent. Given the essential factor of the arrival of the patient at a surgical centre within the "contamination period" it may reasonably be expected that septic infection will be avoided in most cases. Unfortunately a time-lag in evacuation is sometimes inevitable, and established suppuration follows. Advance in the treatment of this condition seems to be almost imperceptible: neither local nor systemic employment of the newer chemotherapeutic substances seems of value. Still more disappointing is the relative ineffectiveness of the Winnett Orr technique as compared with its use in the suppurations of civil surgical practice. This may be due to rapid wasting of the tissues in high-explosive wounds which suppurate, with consequent failure of immobilization, recrudescence of infection, and further spread of sepsis. I suggest that the questions of tissue reactions to suppuration and the mechanisms of repair have not received enough attention in this country, and the discussion of some of these, with clinical inferences to be drawn from them, may be useful.

Exact knowledge of the physiological mechanisms of tissue repair now available originates from the systematic experiments in tissue culture of Carrel and his co-workers: the investigation of the biochemistry of local factors which may accelerate repair or by which differential inhibition of regenerating tissues may be effected is due to a number of research workers, among whom Hammett and Medawar may be cited. An excellent résumé of the subject by Riley (1940) deals exhaustively with this aspect of healing. My aim in this paper is to focus the attention of clinicians on the advances in our knowledge of certain systemic or constitutional factors which also have considerable influence on the repair process. These, too, have been the subject of intensive investigation in the United States and to some extent on the Continent, and the information gained from these researches has been translated into clinical practice in those countries (Whipple, 1940).

It is of the first importance that treatment should have a sound physiological as opposed to an empiric background. Two factors of supreme clinical importance may be considered: (1) the influence of vitamin content; and (2) the effect of controlled electrolyte and protein fluid balance.

Vitamin Content and Avitaminosis

High claims regarding a particular influence in repair have been made for the various vitamins, whether applied locally or given in the diet. Many of these are based on faulty premises or imperfect observation, and it may be stated categorically: (*a*) that no locally applied vitamin has been shown to influence tissue growth, whether the results are assessed scientifically by mensuration or by the effect on mitosis and cell proliferation as estimated either by photomicrography or by measurement of the nucleophosphorus output; and (*b*) that only vitamins C and K taken in the diet have been shown to exert a direct effect on the mechanisms of repair: deficiency of vitamin C results in a fibroblastic aplasia, affecting the collagenation of the proliferated fibroblast cells and their maturation to formed fibrous tissue, and causing weak irregular scars; in vitamin K deficiency the production of prothrombin is inhibited, capillary clotting retarded, and the rhythm of vascular regeneration interrupted.

Several clinical inferences may be drawn from these facts. First, at the risk of appearing polemical, I would say that there is no scientific basis for the very popular use of cod-liver-oil or ointment dressings for the supposed virtue of their vitamin content. I regard their use as an example of pseudo-scientific mumbo-jumbo: any healing effect they may possess dwells, I believe, in their mechanically atraumatic character, and perhaps in the fact that a few hours after their application the wound surface will furnish a distinctly acid reaction (a large volume of research indicates clearly that the discharges of the healing wound have a consistently high hydrogen-ion content). Careful planimetric measurement in six cases treated by cod-liver-oil dressings showed no acceleration of healing, as plotted by the du Nouy formula.

Secondly, it is obvious that the diet of the patient in the surgical ward should contain foods of a high vitamin C content—e.g., fruit and green vegetables—and that care should be taken to ensure that the vitamin is not destroyed in cooking. The recovering patient should have a daily intake equivalent to 75 to 100 mg. of ascorbic acid. If this cannot be obtained from the diet it should be given in tablet form. The effect in the case which is slow to granulate is sometimes dramatic; but no effect on epithelization is to be expected. Thirdly, vitamin K is now available commercially, but by reason of expense its use should be reserved for cases in which recurrent bleeding from granulation tissue is encountered or minor secondary haemorrhage occurs.

Electrolyte Fluid and Protein Balance

This complex factor may be studied from two angles: (*a*) protein loss and protein replacement, and (*b*) the fluid balance and the occurrence of oedema.

HIGH PROTEIN INTAKE

Experimentally, observations of the measurement of healing wounds (Carrel, Fischer) confirmed by those on the tensile strength of wounds (Howes, Ellis, Cutler) have established the fact that a latent period of about four days before repair begins is constant for all clean wounds; this delay is reduced or eliminated by instituting a high protein diet from the start: high fat (ketogenic) diet, on the other hand, prolongs the lag period. Cuthbertson (1936) showed that the protein loss following fracture was very high, and the same is true in cases of prolonged suppuration. I made repeated estimations of the urea excreted in ten cases of prolonged bone or joint suppuration in my wards; this averaged 46 grammes daily: as the excretion of urinary chloride was not equally raised it may be assumed that the increased urea output is due to tissue destruction. In a case reported the nitrogen loss was 26 grammes daily—equal to nearly 2 lb. of muscle tissue.

The clinical significance of the hydrogen-ion content of wounds has received little attention in British surgery. From the work of Girgolaff (1924), Rohde (1926), and others it may be regarded as certain that the healing wound is acid in reaction, and that such acid tissues offer a resistance to invasion by organisms which diminishes as the *p*H

approaches the neutral or alkaline zones. An acid diet maintains this wound acidity, and may contribute to recovery in this way also.

Protein deficiency retards repair in another way. That the most powerful enemy of repair is the occurrence of oedema is a clinical fact with which we are all acquainted; it is well illustrated by cases of delayed union of fractures in which tissue support has been inadequate or gravitational oedema has been permitted. The protein molecule is of large size, and in hypoproteinaemia the missing large molecule is replaced by the smaller molecules of inorganic salts, especially the chlorides, and as a result salt action occurs in the tissues, followed by intercellular oedema.

From these physiological researches the important clinical lesson may be drawn that high protein intake should be arranged for at the earliest day after injury or operation and should be maintained during the whole course of healing. There is a persistent tendency to put a patient on light—that is, carbohydrate—diet in the early days, especially if the temperature is elevated. It will be seen that this is wrong: provided the digestion is competent the diet should include milk, grated cheese, egg albumen, and perhaps gelatin, followed by pounded fish, scraped meat, etc.; while fats, including butter, should be materially restricted. Protein-containing vegetables and cereals—e.g., peas and beans, oatmeal, and bran—may be useful as substitutes in the present shortage of animal proteins. Although cheese has a high fat content it is retained for the ready absorbability of its protein. For parenteral introduction blood plasma no doubt is the ideal, but the supply is limited; a solution containing the total amino-acids of casein, together with dextrose, is being employed in the United States, and the results so far are very hopeful. It is possible that a similar solution may become obtainable in this country.

LOCAL ELECTROLYTE FLUID BALANCE

It has been indicated that massive oedema is greatly inimical to repair: this is equally true of its occurrence locally. The importance of preventing it by maintaining adequate tissue support, by obviating gravitational fluid collections, and by maintaining functional movement so far as possible cannot be overstressed; for similar reasons care should be taken that tension sutures are not drawn so tight as to create areas of oedema between them. In addition some standard should be adopted for the administration of fluid: too often indiscriminate injection of dextrose-saline solution merely results in wrecking the fluid balance, sometimes to the extent of establishing a condition analogous to anasarca. Intake should bear relation to excretion and an endeavour be made to estimate the excretion of fluid as urine in each case where saline infusion is being resorted to. A good working rule is that no more than one and a half times the amount of fluid excreted as urine in twenty-four hours should be administered. Owing to rapid surface evaporation cases of burns can tolerate rather more, but even these wounds can be drowned in tissue dropsy.

These adjustments in the treatment of cases of wound suppuration have been in use for several months in cases under my care, and it is certain that improvement in the condition of these patients has resulted, as indicated by arrest of wasting, absence of oedema, acceleration of healing, and the maintenance of a normal blood pressure. I believe they form a distinct advance in our technique. It is difficult to ascertain the body weight of bed patients. In three cases, however, it was taken weekly; in these an average loss of 24 oz. a week was arrested on the institution of the acid diet, while a fortnight later the average gain was 30 oz.

Wartime High Protein Diet

Adequate supplies of carbohydrate are readily obtained, but the difficulty of maintaining a high protein diet under war conditions is patent. I must here express my indebtedness to Miss Gatenby, matron of the Memorial Hospital, Darlington, for her effort and ingenuity in this matter; at my request she has added the following notes.

In June, 1939, the full diet given in orthopaedic cases and wound infections possessed a moderately high protein content—approximately 110 to 120 grammes of protein a day. A cooked breakfast was supplied from the hospital kitchen to all patients (previously only tea and bread-and-butter were provided), and a better-balanced diet was maintained. The average daily diet was as follows—with as much variety and as little repetition as possible:

6 a.m.: Tea and milk, bread-and-butter (6.2 gm.).

8 a.m.: Milk 2 oz., oatmeal porridge 2 oz., kipper 3 oz., tea and milk, bread-and-butter (31 gm.).

12 noon: Rabbit stew 4 oz., potatoes 8 oz., chocolate pudding 4 oz., custard 4 oz. (42 gm.).

3.30 p.m.: Tea and milk, bread-and-butter, 1 egg (provided by patient) (16.5 gm.).

6.30 p.m.: Vegetable soup 8 oz., bread-and-butter, cocoa (15 gm.).

10 a.m. and 10 p.m.: 5 oz. milk, cocoa, etc. (10.9 gm.).

This diet yielded 121.6 grammes of protein and gave 3,047 calories.

In August, 1940, an endeavour was made to raise the protein content of the full diet to approximately 145 grammes daily, and emphasis was laid on the importance of persevering with a higher protein intake during the first few days until the patient was in a fit condition to partake of the fuller and more substantial forms of diet. The suggested daily diet for the first week was: 1 egg, 5 oz. milk (10.4 gm.), egg custard (5.9 gm.) (1 egg = 5 oz. of milk), 4 oz. minced chicken (29.6 gm.), 6 oz. pounded fish (37.8 gm.), milk jelly (8 gm.), extra milk fluids 5 oz. (4.5 gm.). Total, 96.2 grammes of protein. Balcony treatment, whenever possible, greatly improved the patients' general condition, appetite, and outlook.

To obtain 145 grammes of protein daily the following diet was given:

1. *Animal Protein.*—Breakfast: 4 oz. herring (21.6 gm.), 2 oz. milk (2 gm.), tea (milk) (1.8 gm.). Dinner: 4 oz. roast beef (30.4 gm.). Tea: 1 egg (5.9 gm.), tea (milk) (1.8 gm.). Supper: 2 oz. cheese (14.2 gm.). 10 a.m. and 10 p.m.: 5 oz. milk, cocoa, etc. (10.9 gm.). Approximately 88.6 grammes of protein.
2. *Vegetable Protein.*—Breakfast: 2 oz. oatmeal (7.6 gm.), 8 oz. bread-and-butter (8.8 gm.). Dinner: 4 oz. dried peas (8 gm.), 3 oz. jam tart (3 gm.), 8 oz. milk pudding (10.4 gm.). Tea: 4 oz. bread-and-butter (4.4 gm.). Supper: Vegetable soup (4.8 gm.), cocoa (5.8 gm.), bread-and-butter (4.4 gm.). Approximately 57.2 grammes of protein.

The pulses are among the cheaper foods, and in large quantity will raise the amount of vegetable protein, circumventing the deficiency of animal protein.

The following are valuable foods: Dried peas, butter beans, haricot beans, lentils: can be given as a vegetable or added to soup stock. Pea and bean flour: 1 heaped teaspoonful in each plateful of soup has a protein value equivalent to 1 oz. of meat; by making soup with milk the amount of protein is trebled. Macaroni, semolina, barley: Can be used as milk puddings or for thickening soups. Suet puddings, with milk or egg custard. Cheese: protein and fat content are nearly equal, and both are high. (It is possible to obtain a certain amount of cheese, and necessitous patients benefit.) Corned beef: high protein value, used as iron rations. Farex: added to milk puddings and porridge. Hovis bread: 3 lb. bread yields 100 grammes of protein (richest in nourishment of all breads). Peanuts: 1 oz. yields 8.5 grammes of protein. Bovril and oxo, made with milk: 1 teaspoonful of bovril equals 1/5 oz. meat.

Alternatives for Breakfast.—4 oz. fish cakes (13 gm.), 4 oz. sausage, 2 oz. sardines (11.6 gm.), 2 oz. bacon (13.8 gm.), 3 oz. haddock (18 gm.), 3 oz. herring (16.2 gm.), 3 oz. scrambled eggs (8.7 gm.).

Alternatives for Dinner.—2 oz. boiled mutton (14.6 gm.), 2 oz. fried liver (16.6 gm.), 2 oz. stewed beef (17.4 gm.), 4 oz. stewed tripe (20.4 gm.), 4 oz. fried cod (2.6 gm.).

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NEED FOR BIOLOGY IN EDUCATION

SIR WALTER LANGDON-BROWN'S ADDRESS

At the annual meeting of the British Social Hygiene Council, held at B.M.A. House on July 31, Sir WALTER LANGDON-BROWN delivered an address on " Biology and Health." He began with some remarks on the blight which has fallen upon European culture, the hapless conditions of university life on the Continent, and the subservience of scientific work to National Socialism. Incidentally he mentioned that the *Münchener Medizinische Wochenschrift*, formerly one of the leading medical journals of the world, had now become scientifically negligible, the happy hunting-ground of naturopaths and other cranks who hoped to catch the Fuehrer's eye. The fate of *Pflügers Archiv*, which was for more than seventy years the leading publication of physiological and biological research, was also significant. In 1932, the last pre-Hitlerian year, it ran to five volumes ; in 1938 it appeared as one slim volume, the articles being mainly written by Russians and Japanese.

Sir Walter Langdon-Brown went on to say that, brought up as he had been, he found it hard to disbelieve in progress, though not necessarily as a law. Moreover, he thought the study of biology did impress the idea on the mind as the increasing complexity and adaptations of animal life came to be studied. If the study of biology had been pursued with the same intensity as that of chemistry and physics, it was possible that men might have become so interested in the wonderful processes of life that they would not be so keen on inflicting death. Here he mentioned the three main planks in the platform of the British Social Hygiene Council: (1) the study of biology as a subject of general education ; (2) the education of the educator ; and (3) general enlightenment on the principles of social hygiene. The general public would have no adequate grasp of the principles of social hygiene until they had some idea of biological principles. Recently an inspector of a certain examination of older students remarked to him on the relatively high percentage of failures in biology and the relatively low percentage of failures in physics and chemistry. Inquiry revealed that the teachers in many of the various institutions preparing the students had not been interested in biology and regarded it as a tiresome sideline of their work. If a teacher could not make biology interesting he should not teach at all. Perhaps it was the romanticizing tendency of the English which had made them unwilling in the past to face the uncomfortable fact that behind the divine mystery of the continuity of life lurked the shadows that were responsible for venereal diseases ; but it was ignorance of biology rather than unwillingness to face facts which was responsible for failure to realize the natural law that whenever the continuity of life was threatened the impulse to create more life was increased.

Bearing in mind the shadow which accompanied this natural impulse, the work of the British Social Hygiene Council assumed a new significance. It was beside the point to say that there had been no sensational rise in venereal diseases in this war as in the last. It was like saying that the stirrup-pump had served so well when the last shower of incendiaries fell that it could now be discarded. In view of the fact that it was sometimes said that medical officers of health had little opinion of the usefulness of the work of the Council, fifty leading medical officers had been circularized, and the first thirty-three who had replied all said that they thought the Council served a useful purpose, though reservations were made by two. All replied in the affirmative on the question whether direct education on venereal disease was still necessary, and all except four (who were doubtful) were also in favour of a more general type of health education.

The Untrained Intruder

In view of the recent debate in the House of Commons on the Pharmacy and Medicines Bill, Sir Walter Langdon-Brown added a few remarks on the need for educating legislators. He said he was impressed by the curious bias shown in favour of the intruder into a sphere for which he was not trained, even though he was trained for some other. For example, the pharmaceutical chemist was to be safeguarded if he wished to take over the doctor's work of advising and prescribing, but when it came to his legitimate business for which he had been highly trained, sympathy was shown to the competing interests of the co-operative stores, the grocer, and the herbalist. The Minister of Health was very tender towards herbalists, pointing out that an expert committee had recommended that the collection of herbs for medicines and drugs should be encouraged as much as possible. But as he himself read the report of that committee, what it had in mind was the collection of herbs, not for their administration in a crude form, but to enable the extraction of their active principles in a pure state by skilled pharmacological chemists. The *Pharmacopoeia* would indeed be denuded if deprived of pure drugs of vegetable origin. In other words, the pharmacologist carried out the work of the herbalist in a much more scientific form to a higher pitch of accuracy. What struck him about the whole tone of that debate was the extraordinary *naïveté* with which the value of evidence in these matters was assessed. It might be said that ultimately some steps were taken in the right direction, but these would have been firmer and more speedy if the majority of the legislators had had a modicum of science imparted to them in their general education. There would not then have been so many who seemed willing to believe that an untrained man might intuitively discover a cure for a hitherto incurable disease which could only be brought to the notice of sufferers by advertisements in the lay press.

AWARD FOR GALLANTRY IN CIVIL DEFENCE

The award of the M.B.E (Civil Division) to Dr. WILLIAM REMINGTON, medical officer, Mobile First Aid Unit, A.R.P. Casualty Service, Woolwich, is announced in a *Supplement* to the *London Gazette* dated August 1. The announcement reads as follows :

" During enemy air raids Dr. Remington has shown resource and a high sense of duty. A high-explosive bomb demolished dwelling houses. Dr. Remington was lowered through a hole in the top of the wreckage, which was in a very dangerous condition, to some casualties underneath. He gave them morphine and remained while the rescue party dug out the victims. On another occasion when a building was demolished and people were trapped, Dr. Remington, regardless of his own safety, stayed at the incident for three hours giving treatment to the casualties."

Walter Bauer and Joseph C. Aub (*J. clin. Invest.*, 1941, **20**, 295) state that patients with acromegaly have an abnormal calcium and phosphorus metabolism, characterized by an increased urinary secretion of these minerals. In one patient *x*-ray treatment of the pituitary caused a reduction in urinary excretion of calcium and phosphorus, in the metabolism of which, the authors conclude, the pituitary gland must be considered one of the controlling factors.

LUNG INJURIES IN AIR RAIDS

A DISCUSSION ON PATHOLOGY AND DIAGNOSIS

A conference on the pathology and diagnosis of lung injuries in air raids was recently held at which a number of expert observers pooled their views on this important subject. A full report is printed below.

Sir JOSEPH BARCROFT, who was in the chair, began by saying that a town might be attacked in a number of different ways at the same time. A mixed bag of casualties might occur—some from gas (more perhaps than they guessed), some from blast, and so on. The question was, in relation to the lung, how to sort out the casualties in accordance with the various causes of injury.

Action of War Gases on Lung

Prof. G. R. CAMERON divided gases into those absorbed through the lungs with little local effects and those which acted wholly or mainly on the lungs, producing bronchial damage and bronchopneumonia or alveolar damage and acute pulmonary oedema. Arsine was an example of the first group; particulates, chlorine, hydrogen selenide, phosgene, nitrous fumes, mustard gas, and lewisite vapour belonged to the second group. Bronchial damage resulted in bronchial spasm and destruction of bronchial epithelium. It might be caused either (1) by the irritant gas acting on the lining epithelium with liberation of histamine-like substances, or (2) through irritation of nerve-endings. Mucous glands were stimulated, often with free outpouring of mucus, which tended to plug the bronchial cavities and cause collapse. Bronchopneumonia might follow such blockage when infection occurred.

Four views had been held concerning pulmonary oedema: (1) The gas might act directly on the alveolar capillaries, altering their permeability so that plasma exuded out into the air spaces. (2) The gas might liberate H substances from damaged lining alveolar cells. (3) Oedema might be secondary to cardiac failure. (4) Lung lymphatics might become blocked with lymph stasis and overflow into the alveoli. Some gases acted on the capillaries—for example, lewisite and mustard. Although there was little histological evidence that phosgene altered the permeability of capillaries, there was every reason to believe this to be the case. The second view was debatable, as there was much uncertainty as to the nature of the alveolar lining. Cardiac failure was most often secondary to oedema and not the direct cause. No information existed about lymphatic blockage; indeed, the function of lymphatics in the lung was obscure. Certain risks arose from these lung changes. Bronchial spasm resulting from high concentrations of gas might lead to acute asphyxia and interstitial emphysema. Bronchial destruction was more important because of the danger of bronchopneumonia or bronchiectasis, but fortunately these complications were not common. Pulmonary oedema, if acute, might lead to cyanosis and death from asphyxia. If not so acute there were incapacitation and liability to cardiac failure or infection of the lungs. Haemoconcentration might also add considerably to the risks of circulatory failure. In the dog exposed to phosgene haemoconcentration was high, but quickly passed off. Nevertheless the oedema persisted and the animal might die days after from pure pulmonary oedema. In rabbits haemoconcentration was rarely seen with phosgene, though oedema was marked. What, therefore, was the significance of haemoconcentration? What significance, too, was to be attached to mild pulmonary oedema? How quickly was oedema fluid absorbed from lungs? How much oedema was necessary to produce incapacitation of the patient? These questions, Prof. Cameron said, which were of great practical importance, still remained to be answered.

Lung Injuries in Air Raids

Prof. G. HADFIELD confined his remarks to air-raid casualties presenting severe respiratory symptoms without obvious surgical injury. Such cases included: (1) those suffering from "pulmonary concussion" without damage to the thoracic cage; (2) those suffering from asphyxia; and (3) those whose symptoms were the result of pulmonary fat embolism. Pulmonary concussion, he said, was characterized by multiple pulmonary haemorrhages of considerable size throughout both lungs, usually deep in the lung substance but with no constant relation to the ribs or ramifications of the bronchial tree. Rib markings could be identified only in lungs from infants or young children, suggesting that the elasticity of the thorax predisposed to their production. Naked-eye laceration of the lung or irregular tracking of blood through the lung substance was exceptional, and often no blood was present in the pleural cavities. The size of the haemorrhage was clearly related to the survival period, reaching a maximum in about four hours. In cases surviving for thirty-six to forty-eight hours haemorrhagic areas were, on the whole, no larger than in those surviving four to eight hours only. Capillary bleeding seemed to be responsible for the haemorrhage. A fibrin network formed in the alveoli, and a mononuclear cell exudate appeared, so that in thirty-six to forty-eight hours the histological picture was strikingly reminiscent of lobar pneumonia in the red hepatization stage ("pseudo-pneumonia"). Asphyxia might be presumed to have been a major cause of death when the air passages were found to be obstructed by powdered plaster, brick-dust, etc. It might also be the cause of death when the thorax had been compressed by a heavy mass of wood, stone, or metal. Inhalational asphyxial lungs frequently showed haemorrhages; other cases showed collapse and oedema, which were frequently much more extensive in one lung than in the other, with the usual post-mortem signs of asphyxia. Carbon monoxide poisoning, probably the result of bursting of gas mains, was a frequent complication of pulmonary concussion and asphyxia. The proportion of cases in which fat embolism could be deemed to have caused death was uncertain. Small quantities of fat in the pulmonary capillaries were found in a high percentage of deaths from trauma of any kind. Only when the quantity of fat was large and there was embolism of the glomerular capillaries could much importance be attached to this condition. There was usually a latent period between the incident and the development of dyspnoea. A gross traumatic lesion of subcutaneous fat with a collection of autolysing fat and blood clot was usually found post mortem.

Prof. Hadfield then outlined the clinical manifestations of pulmonary concussion, and emphasized the rapid development of shock, with frequent thready pulse and extreme expiratory dyspnoea. Severe pain and great tenderness of the trunk rapidly developed in the worst cases—probably the result of intramuscular haemorrhage. Dyspnoea might be due to haemorrhage into the respiratory muscle. Restlessness, which was prominent, might be the result of subarachnoid bleeding. Haemoptysis was common within an hour or so of the incident, and tended to be repeated. Dyspnoea became much worse in patients dying after thirty-six to forty-eight hours, and there was haemoconcentration with rise in venous blood pressure. A large venesection might relieve these features. Prof. Hadfield also emphasized the progressive nature of the haemorrhages in pulmonary concussion, and pointed out that one of the chief principles of treatment must be to immobilize the patient as soon as possible and to disturb him as little as possible for a period of several days.

Sir JOSEPH BARCROFT asked how far blast effects were due to something which "hit you outside or inside your lung." It had been shown, he thought, that in a window which had been broken by blast the glass fell out and not in. Was it possible that the burst of the capillary walls was outwards?

Pulmonary Oedema in Gas Poisoning

Prof. SHAW DUNN stressed the importance of dosage of gas in the evolution of symptoms. High concentrations of phosgene elicited violent respiratory disturbance with oedema and over-distension of the lungs, terminating fatally in a few hours; lower concentrations caused early dyspnoea and steadily progressive oedema, which might be fatal but was susceptible to treatment by venesection and oxygen administration. Bronchial spasm was an early event and contributed to the sensation of tightness in the chest and difficulty of drawing breath. Bronchopneumonia was a serious though later addition, and might occur more readily in man than in animals owing to auto-infection or to droplet infection in wards. It added considerably to the risk of fatality, and also, where recovery took place, to the likelihood of permanent damage to the lungs.

Pulmonary oedema was the most fundamental problem in poisoning by lung irritants. Capillaries in the juxta-bronchiolar alveoli showed dilatation and engorgement, with thrombosis in some, and oedema fluid came from those capillaries through which blood continued to flow. The higher the dosage of gas the greater were the dilatation and engorgement of capillaries, and cardio-respiratory embarrassment was more severe, though oedema was less in bulk. Prof. Shaw Dunn discussed the importance of altered capillary permeability in the production of pulmonary oedema, and raised several interesting points. (1) The amount of damage, though sufficient to determine abnormal escape of fluid for many hours, was yet so limited in degree as to permit continued blood flow. (2) There was no evidence that permanent structural changes occurred in the alveolar walls. (3) The most prominent histological evidence of capillary damage was dilatation and congestion. (4) At any moment the total pulmonary blood flow was being transmitted through only a proportion of the capillaries and not through the whole network. Pulmonary capillaries in the gas lesion might thus be visualized as having (*a*) a slower blood flow; (*b*) an increased blood content applied to a greatly increased filtering surface; (*c*) a higher lateral blood pressure, since capillary diameter was enlarged; and (*d*) walls thinner than normally, due to the distension. These factors appeared adequate to account for the leakage of fluid from the capillaries. Escape of this plasma fluid into the air spaces was contributory to haemoconcentration, and the increased viscosity of the blood which resulted doubtless accounted for embarrassment of the pulmonary circulation. Another contributory factor was the greater pressure exerted on pulmonary capillaries by the fluid in the alveoli than by air. Well-timed venesection, which was so valuable in the treatment of blue cyanosis in gassing, depended not only on alleviation of cardiac embarrassment by removal of blood from an overloaded venous system, but also on the reduction of blood volume, which would favour return of fluid to the circulating blood, even from the lungs. In the stage of grey cyanosis, however, peripheral circulatory collapse had set in and venesection was unlikely to be helpful.

Prof. Shaw Dunn thought it unlikely that confusion would arise between the initial concussed state of blast patients and any stage of gas poisoning. He agreed that the clinical conditions would become much more complex if the effects of poisonous gases were added to those of ordinary trauma, as might easily be the case in air attacks.

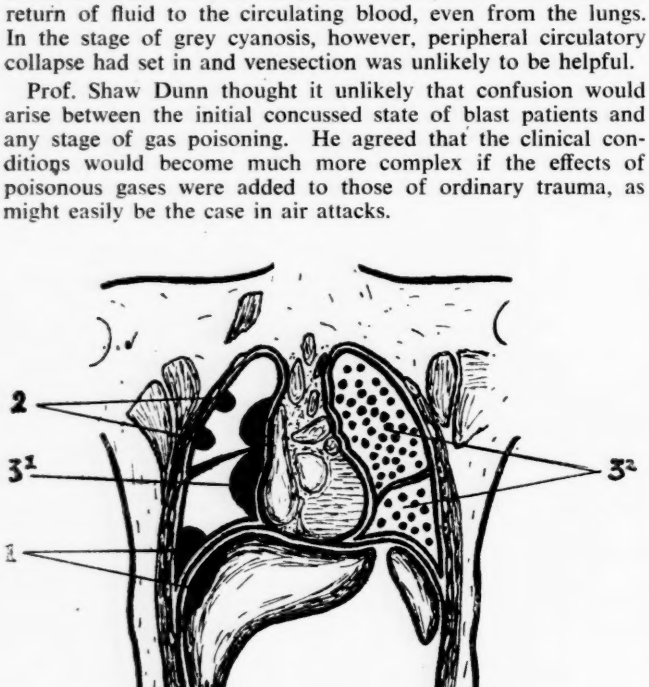

DIAGRAM OF MAIN TYPES OF HAEMORRHAGIC CONCUSSION OF LUNGS

The primary lesions are shown on the right: (1) Phrenico-costal sinus contusion with related liver damage. (2) Two "rib markings" are shown in the upper lobe; these extend to a variable depth and tend to become confluent posteriorly, where they may merge into (3) massive hilar contusions (3^1). The hilar lesion is most massive posteriorly. The secondary lesion (3^2) is shown in the left lung—innumerable haemorrhagic spots, due to inhaled blood, varying in size from about a pin's head to that of a silver threepence. Their distribution is fairly uniform over one lobe, one lung, or both lungs. The variations evidently depend on the amount of blood entering the bronchi and the posture of the patient while the blood is in the bronchi.

Types of Haemorrhagic Concussion

Dr. G. R. OSBORN outlined his experience of primary, secondary, and reactionary lung lesions resulting from a bomb explosion. Primary features were: (1) rib markings, best seen in infants, ill defined in adults, single or multiple, with a location suggesting that they were inflicted with the lungs in the inspiratory position; (2) phrenico-costal sinus contusion; (3) massive hilar contusion. The last, if of obscure origin, might possibly be explained by the penny experiment (if a penny was knocked against a row of pennies only the end one flew off). With a large compressing force the alveoli with air locked in behaved as pennies, and the force was transmitted to the deep parts of the lung in the region of the hilus. In the larger primary lesions the alveoli were packed with red corpuscles which without doubt came from the alveolar capillaries, although the latter were so compressed that the holes through which they had escaped could not be seen. Inhalation of blood was a secondary lesion and resulted in scattering of blood throughout the lungs as small red spots. Reactionary lesions were principally acute pulmonary oedema, "pseudo-pneumonia," and true pneumonitis. Oedema might come on and prove fatal within an hour, or it might not occur for several days. Dr. Osborn thought that cases of acute pulmonary oedema fell into three groups: (1) those primarily due to brain lesions, (2) those due to left ventricular failure, and (3) those due to pulmonary causes. Left ventricular failure was not a satisfactory explanation for all cases. He described a case of lung oedema in a man of 29 with rupture of an aneurysm of the middle cerebral artery. The thoracic organs were normal, and there had been no injury. It was often possible to detect a nervous factor in cases which were apparently due to left ventricular failure or pulmonary lesions. Morphine was the only drug likely to have an effect on the condition.

A Case of Phosgene Poisoning

Commander FAIRLEY described an unusual case of human phosgene poisoning. The patient was an Oxford student who was one of a party round which a tube of phosgene was passed at a demonstration. She was the first person to smell the phosgene. A capillary tube of phosgene was simply cracked in a glass bottle, and she then took a good sniff at the bottle and at once coughed. She had no immediate symptoms, but later in the day began to cough and had all the symptoms of acute asthma. It was not known what was the actual dose of phosgene inhaled. She then became acutely ill, breathing very rapidly, making wheezing noises, but showing no cyanosis. She was so ill that she had to be taken to a nursing home, where she was given continuous oxygen for a week. It was possible that there was a neurotic element in her case. Commander Fairley said he had carried out some experiments on goats in order to try to imitate the conditions under which the patient had inhaled phosgene. The goats were fitted with rubber respirators which were connected to bottles in which similar capillary tubes of phosgene were broken. Phosgene could be smelt in the air expired by the goats. Symptoms similar to those found in the girl were produced. The goats began to breathe very quickly and were obviously ill and restless. Blood counts revealed no change. The goats were killed later, and at necropsy showed no pulmonary oedema, except a very slight degree in one goat. The experiment was repeated, but the phosgene was first put in a Douglas bag, so that the dilution was much greater. This caused no symptoms. The capsules contained 30 mg. of phosgene, which would liberate 8 c.cm. of gas. This was theoretically a fatal dose, but they did not know whether the girl actually inhaled that amount. The striking thing about the human case he had described was the acute asthmatic attack, resembling ordinary asthma. Sir JOSEPH BARCROFT pointed out the importance of the finding that you could have symptoms without pulmonary oedema.

Diagnosis of Blast and Gas Injuries

Prof. J. A. RYLE said that those who had had clinical experience of gas casualties should not find the differential diagnosis of blast injuries and gas poisoning difficult. The likelihood of

meeting a combination of gas and blast effects was probably small. The differential diagnosis would clearly be assisted by the history of the incident. A case of blast was obviously ill from the start. He would complain of pain and be breathless, and might have haemoptysis. The symptoms of gas poisoning, on the other hand, were of later onset and would be unlikely to include haemoptysis or pain, and in most cases of phosgene poisoning there would be a clear history of gas having been used. As regards treatment, rest was the first essential for both types of case. It was not known whether oxygen was beneficial in blast injuries of the lung. The clinical appearance of cases suggested that they should benefit from oxygen. He had seen the B.L.B. mask poorly tolerated, and wondered whether the old-fashioned nasal tube might be better in some cases. He favoured Prof. Shaw Dunn's view that the primary mechanism in pulmonary oedema was capillary damage. He did not think that the oedema was due to heart failure. To sum up: the differential diagnosis of pulmonary concussion and phosgene poisoning should rest on (1) history, (2) the appearance of the patient, and (3) symptoms and signs.

Dr. A. H. T. ROBB-SMITH agreed with Prof. Hadfield about the findings in cases of blast injury to the lungs. He thought that, on the whole, symptoms would not be confused with those of phosgene poisoning, as in pulmonary concussion symptoms developed almost immediately after the accident. Though it was difficult to assess the importance of pulmonary fat embolism, symptoms might closely resemble those of phosgene poisoning, for they came on about the same time, were characterized by severe pulmonary oedema, anoxaemia, and right heart failure. The treatment, however, was similar for both. He advocated a critical study of the pathogenesis of pulmonary oedema in fat embolism, as it might give some indication of the cause of phosgene oedema. In fat embolism the fat was non-irritative and the changes were consequent on vascular occlusion and local anoxaemia—factors which should be considered in phosgene poisoning. In cases of pulmonary oedema he had frequently observed haemoconcentration in the pulmonary circulation, despite the absence of gross change in the peripheral circulation. Haematocrit analysis of the blood in the two circulations might be profitable. He, like Dr. Osborn, had seen cases of so-called neurogenic pulmonary oedema; the condition had been produced experimentally in America by Farber.

Surgeon Rear-Admiral C. P. G. WAKELEY said that he had met with a rather different type of lung injury, in which the damage was certainly inflicted from without. Men so injured had been in the water near the place where depth charges were going off, and said that when the charge went off they could feel the " kick " from it. Some of them were brought in dead; others died afterwards. As a rule they showed no extreme damage of the chest. They often complained of abdominal pain, and often had haemoptysis, haematemesis, and diarrhoea. Post mortem the lungs showed the appearance of blast injuries. There were also injuries such as ruptured liver and other abdominal traumata.

Some Experimental Observations

Surgeon Lieut.-Commander Foss said that he had carried out some experiments on the effect of adrenal cortical hormone in lewisite poisoning, but he had not examined the medulla of the suprarenals.

Prof. SHAW DUNN pointed out that the pressure in the blood vessels was not the only factor concerned in oedema; the rate of flow also played an important part. He was impressed with the importance of alternation in capillary dilatation. He understood that in the denervated lung no alternation in capillaries could be observed. This might be explained by the total blood supply to the lungs being much greater than in an intact lung. The alternation in bronchial activity was interesting, and if it was present in the human lung he wondered whether it should not be observed by radiologists during screening: he had not heard of any such alternation being observed in the human lung. Prof. J. H. GADDUM said that there was evidence that various forms of lung injury liberated histamine, and that it would be interesting to know whether phosgene did this. Laqueur and Magnus had observed a primary fall of blood pressure after phosgene. This might be due to liberation of histamine.

Lung Haemorrhage

Dr. JOAN ROSS dealt in detail with carbon monoxide poisoning and the secondary pneumonia after blast injury to the lung. In compression the haemorrhages might be bilateral and symmetrical, were usually subpleural, and rib markings were usually seen. There was general congestion of the lungs and often oedema; Tardieu's spots were frequently seen, and there might be thrombosis of vessels. In concussion, on the other hand, the haemorrhages were always bilateral and symmetrical, and any subpleural haemorrhage was present as an extension from deeper areas. There was general congestion of the lungs, but Tardieu's spots and thrombosis of vessels were not found. Dr. Ross said she had not seen the massive hilar haemorrhages described by Dr. Osborn. In the typical case of blast injury to the lung there were free red cells in the alveoli, but the alveolar walls were normal and there was no oedema. These were the changes found at the early stages. In cases surviving longer the secondary changes which supervened were very like those seen in an ordinary lobar pneumonia. In the alveoli were red cells, fibrin, and mononuclear cells. It was very difficult to say what degree of fat embolism would prove fatal. Certainly fat embolism would not account for the haemorrhages. Colonel L. E. H. WHITBY asked what Dr. Ross considered to be the source of the fat in cases which had fat in the capillaries. Dr. ROSS replied that in many such cases there were no fractures, and the fat was found only in the pulmonary capillaries and not elsewhere in the body. Its origin was unknown.

Technique of Investigating Action of Lung Irritants

Captain R. H. D. SHORT said that to distinguish between desquamation of the mucous membrane of bronchioles and spasm of bronchioles might not be easy, as both conditions might exist at the same time. The nuclei in desquamated epithelium would be pyknotic. In the experimental animal which had received trypan blue intravenously the mucous membrane would show diffuse cytoplasmic staining. In a series of rabbits exposed to 1 in 15,000 phosgene for fifteen minutes and killed at varying times afterwards collapse was a characteristic finding during the first six hours. Its distribution was lobular. The cavity of many alveoli was completely obliterated; in others it was reduced by more than 50%. It must therefore be decided whether this collapse was real or due to faulty technique. In rabbits in which the lungs had been removed without tying the trachea the degree of collapse described above had not been found, and it was therefore probably not the result of faulty technique. There were two possible causes for the collapse: spasm of the bronchioles, and obstruction of the bronchiolar lumen by desquamated epithelium. In rabbits and guinea-pigs given histamine intravenously examination of the lungs showed a very considerable degree of bronchiolar spasm. There was practically no collapse. It was probable that the alveolar collapse after exposure to phosgene was the result of a complete obstruction by desquamated epithelium of a bronchial lumen already reduced by spasm.

It had been found that alveolar exudate stained in a different manner according to the stage at which the animal had been killed after exposure. Before three to six hours the exudate stained blue with orange G and aniline blue; at about six hours it stained in alternating bands of yellow and blue; and, when fully developed, from twelve hours onwards, it stained yellow. That this was not due to the thickness of the section had been shown by staining sections of 5 and 20 μ, which stained in the same way. Protein films dried on slides and stained showed that solutions containing under 0.5% protein would stain blue; those between 1% and 0.5% had alternating bands of blue and yellow; and those over 1% would stain yellow. Solutions of the three plasma proteins revealed the same phenomenon, and films prepared from samples removed at intervals from plasma digested with a solution of trypsin behaved in the same way as a similar series in which boiled

trypsin solution was used. The staining reaction was not due to breaking down of protein. Though the basis of this staining reaction was obscure it appeared to provide a semi-quantitative method for estimating protein in exudates.

Surgeon Lieutenant R. M. CALDER, R.N.V.R., observed that the role of increased permeability of the lung capillaries in the production of pulmonary oedema had already been stressed. It was interesting to consider the other side of the picture—the mechanism for the absorption of fluid from the alveoli. That such a mechanism existed in a normal lung was an old observation. He had injected as much as 30 c.cm. of serum into a rabbit's trachea without killing it. After three hours about 30% of the injected fluid had disappeared, and 70% was away by eighteen hours. It was hoped to measure the absorption of fluid after phosgene in a similar way, but unfortunately most animals died after quite small injections when previously exposed to phosgene. Another difficulty was that one did not know how much fluid was lost by evaporation. Sir Joseph Barcroft calculated that on theoretical grounds a rabbit could evaporate as much as 25 c.cm. of water in a day. The main histological feature of such lungs was the intensity and speed of the phagocytic response. Within thirty minutes the alveoli and septa contained large numbers of mononuclear cells: where trypan blue had been added to the fluid these cells would nearly all contain granules of the dye. There was no dilatation of the lymphatics. This picture was in striking contrast to what was seen after phosgene, where the alveoli were practically free of cells in the stage of oedema and the lymphatics were widely dilated. The normal animal could remove from its lungs quantities of fluid larger than those found in animals dying from phosgene poisoning; this strongly suggested that after phosgene there must be some interference with the normal absorptive mechanism.

INSTRUCTION IN INJURIES OF THE LOCOMOTOR SYSTEM

Because of the need in both the E.M.S. and the Services for more surgeons with training and experience in the diagnosis and treatment of disabilities of the locomotor system, arrangements have been made for courses of instruction in the subject. Each course will extend over six weeks and will provide practical experience and instruction for the whole of that period. The surgeons attending the course will be divided into groups of not more than four, and each group will be attached to the wards and outpatient department of a senior surgeon experienced in this type of work. They will have charge of cases, carry out treatment, and receive practical demonstrations. They will also attend the work and teaching at neighbouring hospitals, fracture departments, and clinics.

The first course, which will start on September 15, at Alder Hey Hospital, near Liverpool, will be conducted by Mr. T. P. McMurray, Mr. B. L. McFarland, Mr. R. Watson-Jones, Mr. F. C. Dwyer, Mr. G. E. Thomas, and Mr. W. R. Mitchell. In addition to Alder Hey Emergency Hospital, the Royal Infirmary, the David Lewis Northern Hospital, and the Royal Southern Hospital, Liverpool, will be utilized. This course is designed for surgical specialists in the E.M.S. and fighting Services, who should be of the status of junior honorary staff or senior registrars. The number will be limited to sixteen, and applications should be sent as soon as possible to Dr. F. Murchie, Ministry of Health, Whitehall, London, S.W.1. Suitable accommodation will be arranged through Mr. T. P. McMurray in the neighbourhood of Alder Hey Hospital.

Before sending in their applications, medical officers in the E.M.S. should obtain through the medical superintendent or medical officer in charge of the hospital the permission of the hospital officer or group officer, and those accepted will be granted special leave to attend the course. Medical officers enrolled in Classes I, II, and IV will be continued on their existing contracts and will be refunded return travelling expenses from their present hospitals. For those enrolled in Class III, in addition to travelling expenses, a subsistence allowance is authorized to meet the cost of their billeting.

Correspondence

Nomenclature of Pituitary Principles

SIR,—The nomenclature of pituitary principles has been a fruitful source of discussion for some time past, and Dr. F. W. Landgrebe,[1] in a letter to *Nature*, has recently suggested that the general suffix *desmic* (from the Greek δεσμός meaning a bond or link) should be employed in the description of such substances. *Thyrotropic* becomes *thyrodesmic*, for example.

The multiplication of names in a terminology which is already overburdened can, I believe, lead only to still further trouble, and for this reason alone I cannot support Dr. Landgrebe's suggestion. Moreover, there seems to me no valid objection to retaining the suffix *tropic* now that it has become established in the literature, although in this respect I may not be in entire agreement with Prof. J. H. Burn[2] and Dr. A. S. Parkes,[3] as well as with Dr. Landgrebe. Even if the etymology of the suffix *tropic* were definitely unsound, would it be worth the resulting confusion to attempt an amendment in conformity with what we now believe would have been considered good form by the Ancient Greeks? Prof. Burn[2] thought not, and Dr. Parkes[3] would advocate nothing more than a slight change in spelling, although, it should be emphasized, this change in spelling connoted a definite change in meaning. In my opinion not only is a radical change in terminology undesirable on the grounds of convenience, but is etymologically unnecessary. The suffix *tropic* is ultimately based on the Greek verb τρέπω, which, as well as meaning "turn," can also mean "direct" or "change." Thus, on the basis of the origins of the word, a thyrotropic substance is not necessarily one which turns towards the thyroid gland; the term may also denote a substance which directs or changes the gland. The primary meaning is surely not the only one which can be applied to Greek roots in determining their significance in the English language. Every endocrinologist knows what is meant by the adjective "oestrogenic," but the captious logomach might insist that it primarily means "productive of gadflies"! Bacteriologists are not obliged to believe that "neurotropic" viruses are attracted towards the nervous system. Such viruses need do no more than manifest their presence by causing changes in nervous tissue. Therefore, I submit, the suffix *tropic*, in its application to pituitary substances, need not be discarded on the grounds of unworthy ancestors or undesirable relations.

Dr. A. S. Parkes[3] has proposed that "thyrotropic" should be changed to "thyrotrophic" (τροφός = a wet nurse), as descriptive of a substance which induces hypertrophy of the thyroid gland, an action which presumably must be associated with increased nourishment of the tissue. The form *trophic* is correctly applicable to certain of the anterior lobe principles, and this form of the suffix was adopted in drawing up the report[4] of the third International Conference on the Standardization of Hormones, held in August, 1939. Nevertheless, this conference, of which I was a member, agreed that both forms—*tropic* and *trophic*—might generally be used. The disadvantage of the form *trophic*, which is tending to become popular, is that some pituitary principles to which it is indiscriminately applied are not in reality *trophic*. Thus the terms "pancreotrophic," "medullotrophic," and "glycotrophic," which appear from time to time in the literature, are incorrect in that the active principles are not *trophic* under the implied conditions. Such difficulties can be avoided by retaining the original form of the suffix—*tropic*—as a general one descriptive of those pituitary substances which *alter* or *change* other glands, tissues, or metabolic conditions. This does not exclude the possibility of using, in appropriate cases, the form *trophic* as descriptive of pituitary principles which induce enlargement of other glands, although the more general term is, I believe, of greater importance. A more precise and refined terminology should await further development of our knowledge of the nature and action of these interesting pituitary substances.—I am, etc.,

National Institute for Medical Research, London, N.W.3, Aug. 7. F. G. YOUNG.

[1] *Nature*, 1941, **148**, 85.
[2] *Biological Standardization*, 1935, Oxf. Univ. Press.
[3] *Nature*, 1938, **141**, 36.
[4] *Bull. Hlth. Org. L. o. N.*, 1938, **7**, 898.

Psychiatric Problems in Wartime: A Plea for Caution

SIR,—The interesting article by Captain R. F. Tredgold (July 26, p. 109), including as it does detailed observations upon psychotic states occurring in soldiers and their prognosis, together with a description of methods of treatment, gives cause for careful thought, and seems to prompt the question as to whether the present is the time to arrive at conclusions concerning problems of the deepest psychiatric significance.

While it may be of the utmost importance for psychiatrists carefully to record their observations and impressions of the clinical material with which they are called upon to deal in time of war, it is submitted that it will be some time before the opportunity for proper assimilation and mutual discussion of this experience and its implications for psychiatric theory can be obtained. For example, the present war came upon us before it was possible to arrive at scientifically based conclusions as to the precise value and sphere of beneficial application of the various forms of shock therapy. Service needs and the associated demand for simplicity and speed in application required the adoption of Raven-Penrose progressive matrices testing upon large numbers of men before there had been opportunity for full evaluation of this method. The investigation of amnesias, etc., under artificially induced states of narcosis—for example, injection of sodium amytal—prompts certain fundamental questions as to its bona fides from the psychopathological standpoint. Various methods of treatment require to be employed on empirical grounds for their symptomatic value alone and in the absence of suitable checks or controls. This may be admissible, but there appears to be a danger of hasty conclusions being formed from consideration merely of results. Further, when compared with the whole field of psychiatric case material, Service cases, though numerous and a formidable problem at the present time, are nevertheless a limited and selected group developing under artificial environmental conditions.

A case in point is the discussion concerning the nature of depression. It may be that the views expressed by Curran and Mallinson (March 1, p. 305) find a substantial measure of agreement among many psychiatrists, while others will continue to subscribe to the views of Ross and others touched upon in your leading article of July 5 (p. 21). But while it is admitted that in many instances the task of differentiating between "endogenous" and "reactive" depression constitutes a severe test of the psychiatrist's clinical acumen, surely there is danger in teaching the student that "distinction between neurosis and psychosis is at times convenient but without substance," when upon that distinction being made at as early a stage as possible in the development of the mental illness the mental well-being, future, and even the life of the patient may depend.—I am, etc.,

Liverpool, Aug. 7. S. BARTON HALL.

Depressive States in the Soldier

SIR,—My attention has been drawn to Captain R. F. Tredgold's statement in his paper on the above subject (July 26, p. 109) that I "diagnosed the psychotic type [of depression] by the possession of insight." I hope and believe that it is by a mere *lapsus calami* that Captain Tredgold has credited me with this feat, however one interprets his pleasingly ambiguous phrase. To avoid any possible misunderstanding, however, please let me state that if he refers, as I assume, to the patient's insight I have never held or expressed the opinion which he seems to attribute to me. If the word "absence" were substituted for "possession" the sentence would at least be in harmony with my views so far as it goes.

I readily admit the difficulty of assessing insight, but I think most people recognize nowadays that psychiatry is a difficult specialty. I would also suggest, with respect, that in it, as in all other specialties, experience sometimes helps a little.—I am, etc.,

London, W.1, Aug. 3. HENRY YELLOWLEES, M.D., F.R.C.P.

Air-raid Noises in Psychotherapy

SIR,—I was very interested in the article by Majors F. L. McLaughlin and W. M. Millar (August 2, p. 158), and I feel the authors are to be congratulated on the ingenuity which they have shown in getting gramophone records of the actual noises. I foresee great use being made of this type of therapy, especially where the psychotherapist can control the volume of the noise at will while the patient is on the couch, and thus be able to work up "the dose." I hope it will be made possible for those doing this type of work to obtain similar records.

Just after the last war I was in a Ministry of Pensions hospital dealing with war neuroses, and I found the same difficulties—that is, that the men were noise-sensitive. The method which I used was in some way similar to those described in this article. I used to get the men to talk about their war experiences until they were very conversant with the anxiety-provoking incidents, and then I would get them to take a blanket out into a field at the back of the hospital (which was near a railway line), lie down, and relax, and when they saw a train approaching I suggested that they should close their eyes and take their minds back to their experiences in France and link up the emotions which they felt with the noise of the passing train. In a large number of cases the men had violent abreactions coupled with an increase of memory for the actual happenings. After a few weeks of this treatment the majority were able to go into the town near by without suffering any ill effects from the noise of traffic, which had hitherto caused them acute anxiety.

In considering this type of therapy now, in view of my past experience, I cannot help but feel that much greater use should be made of transference relations between patient and therapist—first by adopting the attitude, "We together are facing these difficult situations which proved too much for you when you were alone"; and then, when the patient's self-confidence has been restored, a process of handing back to him the sense of his own responsibility as an adult and a competent member of society.—I am, etc.,

Aug. 5. D. N. HARDCASTLE.

SIR,—If it was Herodotus who declared that history repeats itself, he will find, if he reads the *B.M.J.* in Olympus, remarkable evidence in the article by Majors F. L. McLaughlin and W. M. Millar on the use of air-raid noises on the gramophone as a form of psychotherapy (August 2, p. 158). It certainly recalls with irresistible and entertaining vividness the medicine-man treating disease with his tom-tom and other cacophonies.

Although it is regrettably true that much of the practice of psychiatry at the present moment is empirical in character, one feels compelled to ask: Is there not a limit beyond which the descent into the extra-rational should not be pursued? If the answer is in the negative and the implication follows that symptomatic treatment is good enough, however achieved, I would like to suggest an improvement. It is that, on the conclusion of the gramophone treatment, a bellicose attitude should be stimulated in the patients by teaching them a war dance. In this the Gaumont British News, I am sure, could help from a selection of their films of Darkest Africa. Finally, the treatment could be properly rounded off by "conditioning" the patients to a record of Herr Hitler delivering one of his celebrated harangues. But that perhaps would be going too far!—I am, etc.,

London, W.1, Aug. 4. FREDERICK DILLON.

Cardiac Arrest during Anaesthesia

SIR,—In reply to Drs. H. J. Brennan, J. W. Patterson, and Mr. F. R. Brown (August 2, p. 175), I can state that pure chloroform anaesthesia has not been used in any of the hospitals in the many parts of the country where I have worked. The forty cases represent the collected experience of over twenty years. Half of this time was spent in senior resident posts, where the proportion of serious emergency cases was very high. During this period my anaesthetists were for the most part hospital residents, and although I have not made statistics I do not think that the cases of cardiac arrest were unduly high on this account. In the case quoted in my paper the anaesthetic was administered by a professional anaesthetist of the highest attainments, whose skill I appreciate.

I suggest to Dr. Patterson that a surgeon with a penchant for the nerve-racking ordeal which the necessity for cardiac massage entails must be about as common as a general practitioner with a partiality for puerperal sepsis.

I should like to call attention to an error in my article; "Darling and Lane" should read "Starling and Lane" (July 19, p. 85). I am greatly indebted to Dr. Edwin Starling, who, in

pointing out my mistake, has sent me a most illuminating account of the first and successful recorded case of cardiac massage. I feel sure your readers will be interested to know that Sir Arbuthnot Lane conceived the idea of cardiac massage from watching animal experiments on the heart conducted by Dr. Starling's cousin, the late Prof. Ernest Starling, the eminent physiologist.—I am, etc.,

London, W.1, Aug. 2. HAMILTON BAILEY.

Leadership in Medicine

SIR,—In two letters in your issue of August 2 there sounded a clear note of leadership of a kind for which the profession has been waiting. Sir Frederick Menzies denounced a policy of the Ministry of Health as only another example of "incompetence and unpreparedness," and it is surely time that the Ministry's instructions on the details of medical treatment be equally vigorously denounced as in varying degree superficial, unpractical, inaccurate, and peremptory. It is probable that the instructions have done little harm, because after any useful information has been abstracted they are frequently ignored. But a negative attitude is not enough, and this is one reason why Dr. Douglas Boyd's letter is welcome in calling on us to secure in every sphere a policy which unites personal responsibility with power. There will be great difficulties after the war, and as yet the profession merely exaggerates them and shudders. It is said that individuals will have no money to pay for medical attention; but is this certain? Will there be no money for clothes or food or amusement, and if so how are taxes to be raised to pay for State services? And where will all the national savings have gone? It is said, again, that the large teaching hospitals will require financial assistance from taxes, and that therefore they must come under Government control. The University Grants Committee illustrates that Government financial aid can be given with adequate safeguard of public money and no direct control and no curbing whatever of the grantees' initiative. It is said, also, that the existence of the National Health Insurance Act makes an extension of its methods inevitable, but this is not so, because the working of the Act could be altered so that payments are made for actual services rendered as in most forms of insurance, such as that of the Hospital Saving Association.

There are already medical services of different kinds in this country, and none of them has yet distinguished itself in promoting medical progress. One reason for this is that public authorities do not provide staff or facilities for much more than good modern practice in their hospitals, and feel unable to devote public money to research. On account of this it would be very unwise to make any more hospitals solely dependent on public money which is allocated by Parliament or a local authority. Another difficulty in a service is that the encouragement of new developments is in the hands of the few at the head of the service, so that their sympathies and interests give a bias to the service as a whole. For this reason a national hospital service is to be condemned, and initiative must be maintained in many centres.—I am, etc.,

London, W.1, Aug. 5. J. M. ALSTON, M.B., M.R.C.P.Ed.

Medical Service under the New Order

SIR,—It may not be considered too revolutionary to suggest that the Medical Planning Commission sees to it that the general practitioner has a fairer deal under the post-war new order than under the old.

Let us look at his lot under the old order. Too often he is a tired man. Notwithstanding partnerships and arrangements between neighbouring practitioners off-duty is hard to get. He copes with a confinement after a full day's work, and after conducting a confinement in the night he has to be merry and bright for work next day. Before his morning consultation hours, and often before his breakfast, he has urgent calls to people who have suffered rather than send for him in the night. Through people having suddenly become ill, or through their not having had anyone to send earlier in the day, he often has to work a good part of the afternoon. The "pop" after his evening consultation hours is so popular that it has often to be carried out in duplicate or triplicate. He never goes to bed feeling that his work is done. The doctor must work like this. The public demands service twenty-four hours out of twenty-four. The Ministry of Health, Insurance Committees, and various public bodies expect it to be given. Further, the doctor has to pay towards a mortgage on his practice and very likely on his house. He has to pay for his sickness, for his holidays. He must save for his dependants. Provision for himself he need not make. The Registrar-General's returns show that his life is short. He usually works as long as he lives.

The post-war new order aims at giving the people economic security, healthy conditions, short hours, and big pay. What is sauce for the goose is sauce for the gander. Could the Medical Planning Commission make it an item on its agenda to see that the practitioner, serving a people basking in the sunshine of the new order, gets on himself just a touch of that same sun? The Commission need have no fear that any injustice will be done to the public. A doctor who is working within the bounds of possibility cannot fail to give efficient service. He might have to bear with some bureaucratic control, but there need be no bogy about this if his terms of service were also bureaucratic—that is, economic security, reasonable pay, holidays, off-duty, pensions, etc.

Industrially, it is established that the output of a tired man working overtime does not compare with that of the rested man, and that it pays to maintain the health of the workers. Doctors are just workers. The doing away with the drudgery of doctoring would be a capital thing for the nation and for the doctor.—I am, etc.,

Birmingham, Aug. 7. J. RENWICK.

Wholemeal Bread

SIR,—In his letter (July 12, p. 64) Dr. R. A. Murray Scott compared wholemeal bread with national 85% bread, and criticized some of the statements made by the Medical Research Council in its second memorandum on bread. There are a number of inaccuracies in Dr. Murray Scott's communication.

In the first paragraph he says that the M.R.C. does not give grounds for the statement that "it is undesirable to increase the roughage in wartime diets," and also that he can only find one reference in the literature to work carried out on the effect of wholemeal bread. The M.R.C. clearly states that wartime diets already contain much vegetable food and derive a large amount of roughage from it. The following references may be added to the single one mentioned: Cramer, W., *Lancet*, 1923, **1**, 1406; Gross, L., *J. Path. Bact.*, 1924, **27**, 27; Evans, Geoffrey, *British Medical Journal*, 1929, **2**, 1044; Mottram, J. C., *Practitioner*, 1930, **74**, 691; Lang, E., Gravelli, L. A., and Nash, T. P., *Cereal Chem.*, 1935, **12**, 356; Abelin and Biderbost, *Biochem. Z.*, 1932, **247**, 429.

Dr. Scott says that until recent years wholemeal was the only meal available and was eaten in double the quantity. Now from personal knowledge I know that germ meals consisting of a mixture of white flour and germ, prepared in the manner suggested in Dr. Scott's concluding remarks, have been available to the public for over fifty years. The keeping properties of these meals are better than those of wholemeal, as the germ is sterilized before being mixed. The vitamin B potency is very little affected by this treatment. The keeping properties of wholemeal flour are mentioned by Dr. Murray Scott, who says that flour stored at temperatures below 60° F. was in sound condition at the end of six months. This is not a fair test, as it would not be practicable under ordinary manufacturing conditions to store flour at such temperatures in the summer.

No mention has been made of the disease in bread known as "rope," caused by a slime-forming bacillus (*Bacillus mesentericus panis viscosus*). The disease is liable to occur in bread, particularly in hot weather, if care is not taken in the baking process. Wholemeal bread is particularly susceptible, and would in my opinion be more liable to it than the 85% meal.

The addition of calcium salts to wheat flour is mentioned, and a table showing nutritive values of wholemeal, 85%, and white flour after addition of calcium is given. Here Dr. Scott is unfair to white bread, as the figure he gives for vitamin B_1 potency does not take into consideration the added synthetic aneurin. No calcium will be added to white flour without the addition of vitamin B. I am in agreement with the policy of adding calcium to flour, but experiments show that the choice of the carbonate is not a good one; better results are obtained if the calcium salt is a soluble one. The following references to experimental work support this statement: Mottram, J. C., and Palmer, N., *Cereal Chem.*, 1937, **14**, 683; Palmer, N., and Mottram, J. C., *Biochem. J.*, 1939, **33**, 512; Palmer, N., *Biochem. J.*, 1939, **33**, 853.

In Canada and the U.S.A., Dr. Scott says, they are quite happy about additions to flour. So far as I know, National Food and Research Councils have published approved "enrichment" factors, but no Government action has been taken, with the result that tablets containing thiamine, nicotinic acid, riboflavin, iron, and vitamin C are on sale to bakers and millers alike with no restriction; so that it would seem possible to obtain bread that theoretically should be a "food of the gods." Whether such synthetic additions are equal to, or as safe as, natural products remains to be seen. For my part I think that the British Government would be wise in wartime to restrict additions of synthetic products as much as possible and to rely upon natural foodstuffs. Palatability is a factor which has not been discussed so far and was not mentioned in the M.R.C. memorandum. The baking process plays an important part in deciding whether the finished bread will appeal to the public; the suggested additions should not affect the production of good bread in any way, but unfortunately it has been my experience that brown breads, unless particular care is taken, are not always palatable, and therefore one prefers other bread, knowing full well that it is not so nutritious.

The 85% national loaf and germ breads are, in my opinion, more palatable than wholemeal, and also more attractive in their external and general appearance.—I am, etc.,

The Laboratories, Messrs. Hovis, Ltd., Aug. 1. J. C. MOTTRAM.

Tuberculosis in Recruits

SIR,—The incidence noted by S. H. Graham and M. Davies (June 21, p. 920) of tuberculosis in recruits referred for the first time by the medical boards to the staff of the Welsh Memorial Association appears to me a very much lower figure than 6% if based on the total number of recruits examined by medical boards. The authors do not make any recommendation for grading quiescent or suspected cases. Tuberculosis officers can be of great help to the chairman of the board in these difficult cases and save the country pension claims if activity develops later.

The view of the authors against the advice of the Horder Committee that radiological examination of all recruits "was impracticable at the present time" has been answered in my communication on *x*-ray diagnosis of tuberculosis in the *Journal* of October 26, 1940 (p. 573). In fact, Welsh figures confirm my statement that in spite of increased *x*-ray examination new cases and contacts diagnosed as tuberculosis in England have fallen considerably from 51.2% in 1926 to 35.6% in 1938. The Committee of Inquiry into Anti-tuberculosis Services in Wales and Monmouthshire in 1937 found that for the previous year 20% of cases of tuberculosis proved fatal in three months and 47% of the patients died in less than twelve months. Also for every 100 deaths from tuberculosis 1,055 *x*-ray examinations were made as against only 467 in England; yet of the new pulmonary suspects only 24.02% were found to be tuberculous by the Welsh dispensaries. From the Ministry reports a diagnosis of tuberculosis was made in 30% of new cases and contacts examined in 1933 in Wales as against 45.6% in England.

G. Jessel states (*Brit. J. Radiol.*, March, 1941) that though more cases were *x*-rayed in England in 1938 than in 1930 the number of early cases—that is, T.B− and T.B.+1—decreased in 1938, while the advanced cases—T.B.+2 and T.B.+3—have increased. His explanation that *x*-ray facilities were inadequate or slight in 1930 and that clinical diagnosis of T.B.− cases was unreliable is, to say the least, unconvincing.

The reports of the medical officers of health for Sheffield, which for a number of years in the past had the lowest tuberculosis death rate among the larger industrial cities, concentrate their preventive work on the T.B.− cases. Yet in 1935, of their sputum-positive cases 40% died within the year. Of the 4,271 sputum-positive cases treated from 1911 to 1922, only 5.9% were alive in 1930 in that city. If one analyses mass radiology figures, so often quoted, the percentages of cases of active tuberculosis are similar—namely, 0.5% (E. L. Cooper, *Journal*, August 24, 1940, p. 245) in 22,000 and 0.56% (D. Galbraith, *Journal*, May 10, 1941) in 100,000 Australian recruits. On the other hand, if the various types of *x*-ray shadows are included the percentage evidence of tuberculosis in these two observers' findings is 23 and 2.07 respectively—a marked difference. By mass radiology 8% of Storm Troopers in Germany are found to be tuberculous. S. C. Shanks (*Brit. J. Radiol.*, February, 1941) estimates, from *x*-ray figures published abroad, early tuberculosis in 1% of apparently healthy recruits. Though based on small sections of the community he gives for England 0.6% to 5%, U.S.A. 1.8% to 3.9%, Germany 2%, Spain 4.5%, and China 17.9%. In short, the variation in diagnosis of tuberculosis by *x*-ray enthusiasts is as wide as that of the clinical advocate, only the latter still has to assess the grading of fitness.

In my October communication I stated my experience as No. 2 examiner of a medical board coming across one or two suspect chest cases in an average session. At the rate of two sessions a week in twelve months I must have examined a probable total of 2,500 recruits with an estimated 150 suspects in the few minutes available per individual—namely, 6% of total recruits, of whom a third, or 2%, may be considered to reveal tuberculosis by the average dispensary *x*-ray diagnosis. In my N.E. Divisional area with an urban and lesser semi-rural population the non-reserved age groups show a greater normal prevalence of tuberculosis. Many of my cases may not have been referred to the dispensaries and a lower grading may have been agreed by the chairman, who, more than once, concurred in the opinion that *x*-ray examination did not help in some of these cases. The number of recruits referred with physical signs by medical boards in Wales—namely, 216—is small. This must be the case probably in many areas if board examiners have had no previous experience of chest cases.

Thus one may quote the case of a man aged 33 who was clinically diagnosed as tuberculous with, later, positive sputum; when he was referred to a tuberculosis centre the report was: "*X*-ray and clinical findings not marked." Later a medical board rejected him on the doctor's report. As a public administrator one is faced at the present time with defence service personnel discovered whilst on leave to be suffering from tuberculous pleurisy, etc., who are rejected subsequently as unfit with no established diagnosis of tuberculosis, in some of whom *x*-ray investigation later has not been helpful.

In conclusion I would again plead for a special category for quiescent and non-infective suspect cases not for total rejection and for at least one examiner in a board with some chest experience. Also the Ministry of Health should collaborate with the Ministry of Labour and the Defence Services in initiating research into the incidence of T.B. as shown by available statistics. Every suspect chest case must also have the benefit of periodical *x*-ray investigation.—I am, etc.,

Leeds, July 24. Z. P. FERNANDEZ.

Activity of Tuberculosis

SIR,—In his paper on carriers of tuberculosis (May 3, p. 665) Dr. James Maxwell observes that the presence of tubercle bacilli in the sputum does not of itself indicate active tuberculosis of the respiratory tract. I gather from his letter in your issue of July 26 (p. 136) that Dr. Alec Wingfield accepts this conclusion. Whether we shall all follow his example depends, it seems to me, on our definition of the word "activity." This is not hair-splitting, for the question as to whether a lesion is active or not is most important to the patient, the physician, and the general public. May I call on my old friend and teacher, Dr. Maxwell, to supply this definition?

I should like to outline two types of case: (*a*) Symptoms are slight: breathlessness on exertion and a little sputum; physical signs are those of apical fibrosis; *x*-ray picture shows a tuberculous lesion in this situation and the sputum is positive; a period of observation shows that the lesion is not getting larger nor the patient more sick. (*b*) Classical symptoms and signs of pulmonary tuberculosis are present; *x*-ray picture shows a tuberculous lesion in the lung and the sputum is positive; the lesion is getting larger and the patient more sick. I suggest that both these patients have active disease; in (*b*) the process is advancing; in (*a*) it is not. Dr. Maxwell suggests that (*a*) has not got active disease but should be classed as a carrier. I cannot agree with this. It seems to me that when a patient has a demonstrable tuberculous lesion in the lung and when he has sputum which contains tubercle bacilli then the lesion is, by definition, active. As Dr. Maxwell says in his letter (July 12, p. 65), we do not apply the term "active" only to those lesions which are advancing. An active lesion may be advancing (as in (*b*)), or stationary (as in (*a*)), or retrogressing (as in the patient who is

improving under treatment); but if tubercle bacilli are found in the sputum it is still active. If they are not found the test is inconclusive, and one must decide the question of activity on other evidence. Is this the view of most tuberculosis physicians? Please let us have a generally accepted definition of activity before the word has lost all meaning!—I am, etc.,

Westminster, S.W.1, July 28. LAWRENCE ROBERTS.

Carriers of Tuberculosis

SIR,—Dr. E. Fraenkel in his letter (June 21, p. 946) does not like the term "tuberculosis carrier" as advocated by Dr. James Maxwell in his paper (May 3, p. 665). To my mind the term is admirable. It may not be correct pathologically, but from a public health standpoint it has tremendous propaganda value, and the detection of tuberculosis could do with some propaganda.

I would go further than Dr. Maxwell and include in his unsuspected carriers all those undiagnosed adult men and women who have very chronic cavities in their lungs and daily expectorate tubercle bacilli in their homes and factories. These people—apart from a productive cough which they call "bronchitis" or "catarrh" or a "smoker's cough"—seldom complain of anything else and rarely seek medical advice. After many years, and if the disease progresses, other symptoms appear and they are eventually diagnosed, or maybe haemoptysis brings the disease to light. But in the meantime these people have infected one or more members of their families, and perhaps other home or work associates.

Tell the public that a person can "carry" tuberculosis without feeling ill, and that he can infect and kill others (with poor resistance) and go on living himself. The fear of what an *x*-ray examination will show prevents many people from being *x*-rayed. I think they would readily submit to *x*-ray examination which might show them to be "carriers" (with the possibility of future breakdown) and not a "real" consumptive, like So-and-so, who has died of the disease. Having prepared the ground thus, the examination of contacts of young persons with tuberculosis (of probable human origin) must not rest with *x*-ray examination of other young persons in the home. Parents and other adult members of the family must be *x*-rayed, and, where there is a productive cough, sputum be investigated. If the results are negative, then the carrier should be sought at school, workshop, office, church, etc. The carrier does not necessarily require institutional treatment, especially in these days of limited accommodation. Tuition on the prevention of infecting others can be taught at the dispensary. Work can be continued if the only symptoms are cough and sputum, and the evening temperature and B.S.R. are normal. Serial *x*-ray films will decide when and if other treatment is necessary.

Spot the carrier of tuberculosis now and do not wait for bigger schemes of mass radiography to do it.—I am, etc.,

The Liverpool Sanatorium, Frodsham, Aug. 4. R. WRIGHT.

Classification of Cases of Albuminuria

SIR,—Dr. Alexander Lyall, in his article on the classification of cases of albuminuria (July 26, p. 113), again raises the rather vexed question of so-called orthostatic albuminuria. While agreeing with all the hypothetical causes he suggests (they at least cannot be disproved) I should like to suggest one more possibility. Often in routine examinations for insurance, etc., I have come upon this phenomenon and have almost always elicited a history of masturbation. To prove this as the cause of the albuminuria is simple: it is only necessary to get two specimens from the patient—one immediately or soon after masturbation and one where the bladder has been emptied between masturbating and obtaining the specimen. As the patients are usually told to bring a morning specimen a trace of albumin is often found in it. Incidentally, orthostatic albuminuria is usually found in the morning specimen, and just as often represents the net result of the nocturnal eroticism.—I am, etc.,

Darwen, Aug. 3. J. FERGUSSON.

Burns from Penetrating Bomb Fragments

SIR,—I suggest that the explanation of the delayed discharge of intestinal contents from a retroperitoneal wound of the colon, in the article by Mr. Geoffrey E. Parker (July 26, p. 119), is to be found in the observation that there was "some tissue necrosis from burning." Bomb fragments at close range are always hot enough to produce burns. In a patient of mine who recovered from six penetrating wounds of the jejunum the fragment had come to rest in the coelomic cavity. An adjacent unperforated loop of ileum showed a white burn with charred centre, which I dealt with by infolding. Its appearance strongly suggested that had it been left it would have perforated some days later. A retroperitoneal burn of large intestine would present a different problem. It should not be infolded, but free drainage would be necessary. The site of bomb fragments in limbs is frequently indicated far from the wound of entry by the skin burn which they produce over them, and clothing carried in by fragments is often scorched so that it crumbles to dust during attempts to lift it out of a wound.

Mr. Parker suggests that his patient was lucky that he did not develop a spreading peritonitis. He would have been in greater danger of this had the peritoneum been opened. Wide drainage of retroperitoneal wounds of the large intestine is essential. The patient's life was probably saved by the early extraction of the foreign body packed in by the surgeon after he had removed the metallic foreign body.—I am, etc.,

FRANK STABLER,
Aug. 2. Surgeon Commander, R.N.V.R.

The Envelope Treatment of Burns

SIR,—Those who tried the Carrel-Dakin method of treating wounds in the last war will remember that occasionally from about the fifth to the twelfth day the patient would suffer from malaise and become tinged lemon yellow. Both skin and conjunctivae were affected. The urine was normal. There was frequently a rise of temperature to 101° F., and the liver was sometimes tender. The signs subsided in two to three days on discontinuing the hypochlorite. Whether this condition will occur when electrolytic or a stabilized hypochlorite is used, or only with that produced by ordinary chemical means, is not known to me, but it seems opportune to draw attention to the matter.—I am, etc.,

London, W.1, July 31. G. H. COLT.

The Darning of Hernias

SIR,—I was interested to read Mr. G. Stafford Mayer's letter (August 2, p. 176) on the darning of hernias. I am sure the majority of surgeons are now agreed that Bassini's operation and its many modifications leave much to be desired, and that "darning" with some suitable material gives much better late results. I feel, however, that some of the objections which Mr. Mayer raises to Gallie's operation are totally unfounded—in my experience at least.

There is no need to make a long wound in the thigh or to stitch the edges of the fascia together after taking the required number of strips, nor, in my experience, are fasciotomes "most tricky instruments to use," as Mr. Mayer suggests. During the last year I have performed Gallie's operation in ninety-five cases, and never once has the fasciotome given any trouble, nor have I had to employ a tenotome to free the end of the strip. The fasciotome I always employ is that designed by Moseley, and the fascia is obtained by making a transverse incision on the outer aspect of the right thigh (the instrument being easier to use on the right side) about two inches above the upper border of the patella; the incision need never be longer than three inches. The fascia lata is cleaned with a swab soaked in saline, and is then incised transversely in the line of the skin incision. The fascial strips are then taken by means of the fasciotome, and with care six or even seven strips each 1/4 inch wide can be obtained from one thigh, and not a "maximum of four," as Mr. Mayer states. It is very seldom that one requires more than three strips for even a direct hernia, so that it is possible to obtain sufficient fascia from one thigh to do a bilateral repair in the average case.

As regards the danger of a haematoma in the thigh after using the fasciotome, I can honestly say that I have never once seen one. If one is worried about the possibility of a haematoma, a firm elastoplast bandage applied round the thigh at the conclusion of the operation will obliterate the potential space to which Mr. Mayer refers. Personally, I take the fascia before exposing the hernia, but leave the sewing up of the leg wound until the very end of the operation. This gives me the opportunity to "strip" the thigh downwards and remove any extravasated blood before finally stitching up the thigh and applying the elastoplast.

I have only twice seen a muscle hernia in the thigh following removal of fascia lata, and in both these cases the fascia had been taken through a longitudinal incision over the upper end of the fascia. I believe that a muscle hernia is very rare after operation according to the method I have described. I make a point of inquiring whether the leg has given any trouble when I see my patients after they have returned to work, but have yet to get a positive answer. It is of importance to mention that the majority of my patients have been miners and labouring men, and in this connexion I remember one man (who was a lorry driver) telling me that the leg from which the fascia had been taken "felt stronger now than the left leg." My impression is that herniation is prevented by a series of strong transverse fibres at the lower end of the fascia lata, which are not disturbed or severed if the fasciotome is guided deep to them during its stripping motion, and can be felt easily if a finger is inserted into the upper edge of the wound.

I have only had a very limited experience of silk as a repair material, but, enthusiastic as I am about the value of fascial grafts, I am equally prepared to believe that floss silk will eventually take its place.

In conclusion, I was glad to see Mr. Mayer stressing the importance of the fascia transversalis as a barrier to the posterior wall of the inguinal canal. I think its true strength is best appreciated when one has to divide it in exposing the neck of a femoral hernia above the inguinal ligament.—I am, etc.,

Edinburgh, Aug. 5. LEWIS G. CRUICKSHANK, F.R.C.S.

Treatment of Impetigo Contagiosa

SIR,—I have read Lieutenant E. Snell's letter on impetigo (August 2, p. 178) with interest. In my opinion failure with ung. hyd. ammon. dil. is due to seborrhoea in his patients, which is aggravated by the base in this ointment. I have had good results with hyd. ammon. with a vaseline base or with zinc paste: ten grains to the ounce is usually strong enough.—I am, etc.,

London, S.W.2, Aug. 4. M. MACSWEENEY.

Sugar-free Diet and Hyperchlorhydria

SIR,—I have been very much impressed by the marked improvement in cases of hyperchlorhydria after the adoption by the patient for two or three weeks of a sugar-free diet. There are many supporters of the view put forward by the late Sir D. P. D. Wilkie that the "abdominal triad" of peptic ulcer, appendicitis, and gall-bladder disease are all caused by a bacterial infection, which is frequently streptococcal. Rosenow[1] laid stress on the important part which the streptococcus plays in gall-bladder disease, and his work has been confirmed by Illingworth[2] and A. L. Wilkie.[3] Even those who do not agree with this view will admit that there is often a dramatic improvement in a duodenal ulcer following the removal of a chronically inflamed appendix.

While it is obviously absurd to expect a change of diet to cure a chronic appendicitis or cholecystitis with gall-stones, it is only reasonable to remember that these are the end-results of an infection which may have been present for several years. These cases are enormously outnumbered by indefinite cases of so-called chronic indigestion, to which it is impossible to give a definite name but which may, in this view, be regarded as the early stages of an intestinal infection that may or may not end in a condition demanding intervention by the surgeon.

It is interesting to observe that many of the diets recommended for acute peptic ulcer—for example, starvation for a few days, milk at short intervals, and even minced raw beef—have one feature in common—namely, the withholding of sugar—and it might be that some part of the improvement is due to the alteration in the intestinal bacterial flora brought about by the absence of sugar as well as the more obvious advantages of these diets. Additional evidence might easily be obtained from the improvement in symptoms of "chronic indigestion" which might be expected when cases of diabetes have been on a sugar-free diet for two or three weeks, in the absence of focal infection in these cases.

Cane or beet sugar only occurs in Nature diluted with large amounts of vegetable matter. In its refined or concentrated state it is an almost universal article of diet, and many children develop gastro-intestinal catarrh or "mucous disease" through over-indulgence.

May I suggest that there are reasonable grounds for inquiry into the effect of sugar in the diet on the incidence and treatment of certain abdominal disorders—namely, "chronic indigestion," peptic ulcer, appendicitis, and gall-bladder disease—which some view as being the result of a streptococcal infection in a large percentage of cases?—I am, etc.,

St. Faiths, Norfolk, July 28. J. N. GALE.

REFERENCES

[1] Rosenow, E. C., *Collected Papers Mayo Clin.*, 1919, **2**, 819.
[2] Illingworth, C. F. W., *Brit. J. Surg.*, 1927, **15**, 221.
[3] Wilkie, A. L., ibid., 1928, **15**, 450.

Diagnosis of Yellow Fever

SIR,—In the *Journal* of August 2 (p. 171) the following unadorned statement appears in the general discussion after Dr. G. M. Findlay's address at the annual general meeting of the Royal Society of Tropical Medicine and Hygiene: "The absolute impossibility of diagnosing yellow fever on clinical grounds was stressed." To those who remember the worship of that golden calf, *Leptospira icteroides*, for many years, during which the brilliant work of the American Commission under Major Walter Read seemed to be thrown on the scrap-heap, a protest is necessary.

All observers agree on the difficulties of clinical diagnosis, but to state that it is "absolutely impossible" is absurd. Experts have pointed out the great importance of the diagnosis of the first case in any outbreak, and on this early recognition depends to a great extent the effect of local preventive measures. It is to be hoped, therefore, that clinical observers will not allow themselves to be discouraged by this bogy, which is raising its head by no means for the first time.—I am, etc.,

Liverpool, Aug. 5. G. E. H. LE FANU.

Lack of Calcium

SIR,—The letter by Dr. George Graham and Mr. H. Jackson Burrows (August 2, p. 176) would be of far greater interest if they could show that the addition of simple calcium salts to the diet prevented or cured senile osteoporosis.—I am, etc.,

Middlesbrough, Aug. 5 R. N. HERSON.

Novocain Injection in Myalgia

SIR,—I was very interested in the letter by Lieut. M. Good (August 2, p. 175), in view of the following case which I have treated with novocain for myalgia according to the method advocated by Lieut. Good.

A woman of 43 has suffered from myalgia in several localities, but in particular in the region of the left trapezius and deltoid. She had severe pain down the left arm. I found a very tender and well-localized area in the deltoid close to its acromial origin. On inserting the hypodermic needle here she complained of severe constricting pain in the chest of such a nature as to be unbearable. She became pale and her pulse rapid. After persevering with the injection the pain disappeared, and she had marked relief from myalgia and was able to move the arm more freely. When the effects of the injection had worn off she had a return of the pain in the chest for about twenty-four to thirty-six hours, and volunteered the information that she was sweating in the left palm. This I confirmed by examination.

Since then the patient has had marked relief from her myalgia, and neither the pain in the chest nor the increased sweating of the left palm has recurred. There was no history of pain in the chest previous to this injection. The patient is not of the nervous type, and I had injected a myalgic area on her on a previous occasion.—I am, etc.,

London, N.8, Aug. 6. K. M. HAY.

Communal Feeding in Schools

SIR,—I am very glad that you found space for your correspondent's article on the need for an obligatory midday meal in schools (July 26, p. 133). There is perhaps no single act which could contribute so much of permanent value in education, and the author's argument that war has converted something highly desirable into a necessity seems incontestable.—I am, etc.,

Inverness, Aug. 4. DUNCAN G. LEYS, D.M.

Obituary

DUNCAN FORBES, M.B.E., M.D.

Late Medical Officer of Health, Brighton

We regret to announce the sudden death in London on July 25, after an operation, of Dr. Duncan Forbes. A distinguished sanitarian, he was for many years medical officer of health and school medical officer for the County Borough of Brighton.

Duncan Forbes had a brilliant record as a student of the University of Edinburgh. He graduated M.B., Ch.B. with honours in 1898, took the B.Sc. in public health in 1901, and the Cambridge D.P.H., and was awarded high commendation for his Edinburgh M.D. thesis, which was accepted after he had worked for two years as Crichton scholar in pathology; he was also awarded a special certificate in tropical diseases by the University of Edinburgh. He served as resident physician at the Royal Infirmary of Edinburgh, and as resident medical officer at the Monsall Fever Hospital, Manchester, and then in 1902 became assistant M.O.H. for Manchester. Three years later he was appointed M.O.H. for Cambridge. His long and fruitful career in public health administration at Brighton began in 1908. He had been a member of the council of the Royal Sanitary Institute, an active Fellow of the Society of Medical Officers of Health, and examiner in public health for the Edinburgh M.B. In recent years he contributed to the *Lancet* papers on water-borne diseases, on vaccination in the control of small-pox, and on exclusion from school of measles contacts.

For the following appreciation we are indebted to Sir ARTHUR NEWSHOLME, who preceded Dr. Forbes as M.O.H. for Brighton, and was afterwards Principal Medical Officer to the Local Government Board:

I only came to know Duncan Forbes well after he became my successor at Brighton: but already I had (as an examiner at Cambridge) known him enough to realize his qualities: and I had some slight influence in securing his election at Brighton. For Brighton his appointment was invaluable. He had the qualifications, mental and moral, which are specially needed for such a post. It is difficult to summarize those qualities satisfactorily when one is an octogenarian, but the characteristics which stand out in my mind are integrity and originality. He never disguised his views of desirable policy though it might be unpopular, and in some instances—as in housing of the people displaced from slum property centrally rather than peripherally—his views did not always find acceptance. From the point of view of those displaced he was right. I recall one instance in which integrity and scientific accuracy were conjoined. It required courage to discard and abandon much of the elaborate technique involved after a case of infectious disease. He was among the earliest sanitarians in this country who realized that what was to be feared was persons, not things: that persons carried about the infection they had acquired; and that articles might usually be neglected except for what may be described as a meticulous "spring cleaning." In this discovery his name stands alongside of that of Dr. Charles Chapin of the City of Providence, U.S.A. Perhaps they acted independently. I knew them both intimately; and it is right that the names of Chapin and Forbes should be remembered in this practically important research.

THOMAS GIBSON, M.D.

Late Professor of Pharmacology, Queen's University, Kingston, Canada

Dr. Thomas Gibson, who died on July 2 at the age of 76, had been for many years a member of the British Medical Association. He occupied an important place in the life of Canada as physician in Ottawa and professor in Kingston.

Thomas Gibson was born at Strabane, County Tyrone, Ireland. His father, James Gibson, was a Presbyterian minister; his mother, Hannah McLean, came of a family which had emigrated from the western isles of Scotland to Australia. In 1873 the Gibson family moved to Perth, in Scotland, where Thomas attended the local high school and later on the collegiate school in Edinburgh. In 1884 he graduated M.A. at the University of Edinburgh, and in 1894 M.B., C.M. with first-class honours. For six months he acted as house-physician to the late Sir James Affleck.

Dr. Gibson (writes a colleague in Kingston) came to Canada in 1895 as medical A.D.C. to the late Lord Aberdeen. In 1898 he started practice in Ottawa, where he was medical attendant to four successive Governors-General, and where he built up a large practice. In the same year he married a daughter of the late Rev. Dr. George Carey of St. John's, New Brunswick. Many of those still living in Ottawa will remember Dr. Gibson as a sympathetic, kindly, and skilful family physician. While in Ottawa he was attached to St. Luke's, the Maternity, and Water Street Hospitals. In 1924 Queen's University was looking for a teacher of therapeutics and pharmacology. Realizing that the person best fitted to teach the action of drugs to the medical student was a man with wide experience in the application of these drugs in general medical practice, the trustees appointed Dr. Gibson to the Douglas Chair of Therapeutics and Pharmacology. With characteristic thoroughness, and before taking over his professorial duties, Dr. Gibson spent some months in England, working under Prof. W. E. Dixon at Cambridge. For fourteen years Dr. Gibson was responsible for the teaching of his subject to Queen's students, and during this period he built up a department second to none in the university. There was no more popular professor in the medical college. In 1934, feeling the need of additional help in the department, he secured the appointment of Dr. Eldon Boyd, an able pupil, as his assistant. It was natural, therefore, that on his retirement from the chair in 1938 he should hand over his duties to Dr. Boyd. Although he gave up the teaching of pharmacology at this time, he continued to lecture upon the history of medicine until the end of the session just now completed.

Dr. Gibson was a true humanist. He was interested not only in medicine but in music, and was also a keen student of English literature and an appreciative collector of good prints and paintings. His own literary and historical writings include a valuable study of the work and influence of Theodore Mayerne, physician to the Royal Family in the time of James I, published in the *Annals of Medical History*. He wrote also a history of Kingston General Hospital and several articles dealing with the early years of Queen's Medical School. He had a remarkable faculty for delving among old records and periodicals and extracting from them relevant information.

Dr. Gibson was the honorary secretary of the central board of the Victorian Order of Nurses from 1898 to 1920 and its president from 1920 to 1922. In recognition of his pioneer work in the institution he was in 1911 given rank in the Order of St. John of Jerusalem. He was a foundation Fellow of the Royal College of Physicians in Canada and a member of several learned societies.

J. S. GRAY, M.B., and J. P. GORE GRIMES, M.B.

Every one of the heavy air raids on Coventry has left its scars, wounded, and dead. In April the Coventry and Warwickshire Hospital was well within the target area and suffered the full weight of the terrific bombardment, and among those who lost their lives untimely while on duty were Drs. J. S. Gray and John P. Gore Grimes.

Dr. Gray, a native of Edinburgh, received his education at George Heriot's School and at Edinburgh University, graduating in July, 1939, as M.B., Ch.B. His prowess at golf achieved for him a place in the university team, and he was also awarded his "green." Shortly after graduation he went to the Coventry and Warwickshire Hospital as house-physician, and showed outstanding ability. His second appointment was that of senior resident in charge of the resuscitation wards and an assistant in a department of pathology. He was particularly interested in haematology, and under the supervision of the director of the laboratories devoted much of his time and energy to developing the excellent blood transfusion service. Dr. Gray had been on duty throughout all the major raids on Coventry. Earlier on the fateful night he received a serious hand injury, but without

thought of his personal welfare he refused to leave his wards, and subsequently received further injuries which proved fatal.

Dr. Gore Grimes, a native of Dublin, entered Trinity College, Dublin, from St. Gerard's School, Bray. In 1934 he joined the medical school of Dublin University and graduated M.B., Ch.B. in 1939 with honours. He swam for the water-polo team of Trinity College, and represented the Dublin University Yacht Club in several events. After graduation Dr. Gore Grimes held resident posts in Dublin and also did postgraduate work at the Rotunda. In England he was house-surgeon to the Children's Hospital, Birmingham, before going to the Coventry and Warwickshire Hospital as a house-physician. This appointment he took up just before the bombardment of Coventry in November, and in his short stay he was observed to be keen, diligent, and sincere in all his work. His untiring work on the night of April will never be forgotten.

These men (writes the Resident Surgical Officer) were our colleagues; their willingness to help, their unselfishness, and their popularity with all of the Coventry and Warwickshire Hospital are still in our minds. Their careers, cut short so early, indicate in some measure to what heights in the profession they might have climbed, but they died with so many patients to whom earlier in the night they had carefully administered the healing art.

PROF. A. J. CLARK

Brigadier E. M. COWELL writes: One morning during the last days of the Battle of Flanders, 1940, I was, when driving, stopped by an orderly on a motor cycle, who had been sent out by his officer to look for medical help. I agreed and followed my guide. After repeated halts, in the nature of evasive action against dive-bombing, I entered a rather knocked-about building in Hazebrouck and found Colonel Clark acting as a medical officer to the garrison, which was fighting a desperate delaying action. He was very tired, as we all were, but cheerful and doing his best for many severely wounded. Colonel Clark served in France from 1939 till he came away off the beach at Dunkirk, and he occupied an important advisory post at G.H.Q. His fearless devotion to duty and humanitarian efforts should provide a lesson for all of us in the medical profession.

Dr. HENRY LANGDALE died at Stanley House, Warrington, on July 27, aged 74 years. He was a student of Owens College, and qualified M.R.C.S., L.R.C.P. in 1888, taking the M.B. and M.D. degrees of the University of London in 1893. Before starting his career at Warrington, where he became consulting physician to the Royal Infirmary, he had served as house-surgeon at the Manchester Royal Infirmary. "W. E. B." writes: The death of "John" Henry Langdale has deprived Warrington medicine of its best link with the nineteenth century, for after being house-surgeon at the infirmary he bought a well-established practice in the town in the middle of the 'nineties. He had been in active practice, and was often to be seen cycling on near-by visits until a month of his death. His personal interest in and friendship for his patients were unbounded; in fact he had few interests besides them and books. A serious illness fifteen years ago prevented his taking an active part in medical affairs with his colleagues, but before that time many of them had cause to appreciate his kindly and willing help. He leaves a widow, a daughter, and a son. Dr. JAMES BENNET also sends the following appreciation: Dr. Langdale's medical colleagues in Warrington and district feel a great sense of loss now that the senior member of the medical profession in this district has "passed on." A man of few interests outside his own profession, he was the very embodiment of all that is best in the true family doctor tradition, to which my own family bears grateful testimony. He came to Warrington only a few months short of fifty years ago as junior house-surgeon, subsequently becoming senior, and it was not surprising that he afterwards decided to stay on in the town in which he had already become known as a competent physician and surgeon and had earned the good will of both the infirmary board and the public. He remained an honorary physician at the infirmary for many years, and was the oldest member of the British Medical Association in this area. Having further extended a high-class practice taken over from the late Dr. Sherratt, to whom he had been assistant, he considered it to be in his best interests not to participate in the panel scheme when the N.H.I. Act came into being; but as a consultant to panel practitioners he was in great demand. For over forty years and up to the time of his death he was medical visitor to the mental deficiency homes of the West Derby Hundred and to the Haydock Lodge Private Mental Home, where it was my privilege to meet him quarter after quarter, and I can therefore vouch for the very high esteem in which he was held by all the visiting magistrates. Cultured and courteous, Dr. Langdale set a very high standard, never spared himself, and, being a man of intense kindliness, had as a reward the esteem and affection of his patients and his medical colleagues.

Dr. RODERICK MURDOCH MATHESON died at his home in Edinburgh on July 31. He was educated at the University of Edinburgh and the School of Medicine, and graduated M.B., C.M. in 1893, proceeding M.D. (with commendation) four years later, taking for his thesis empyema and its treatment. In 1901 he contributed an article to the *British Medical Journal* on haematemesis occurring in the course of appendicitis. In 1904 he became an F.R.C.S.Ed. He held the posts of assistant surgeon at Noble's Hospital, Isle of Man, and house-surgeon to the lock wards and clinical assistant to the skin department of Edinburgh Royal Infirmary before settling in practice in Edinburgh.

The Services

NAVAL AWARDS

Surgeon Captain P. M. May, R.N. (ret.), has been awarded a Greenwich Hospital pension of £50 per annum in the vacancy caused by the death of Fleet Surgeon C. S. Facey, R.N. (ret.).

The M.B.E. has been awarded to Temporary Surgeon Lieut. F. R. Badenoch, R.N.V.R., for courage in rescue work during enemy air raids on Portsmouth.

ARMY AWARD

The M.C. has been awarded to Captain R. N. Lees, R.A.M.C.

CASUALTIES IN THE MEDICAL SERVICES

Royal Navy

Surgeon Lieutenant DAVID AUSTIN PROTHERO, who was killed in action, received his medical education at St. Bartholomew's Hospital and qualified M.R.C.S., L.R.C.P. in 1935. Two years later he took the D.A. His home was at Bedford. He was a member of the British Medical Association.

David Prothero (writes "E. H. P.") was injured on duty at sea and died soon afterwards. It was characteristic of him that his first thought after the accident was for those casualties near him, and it was not until they had been attended to that he himself went down to the sick bay. David was an ideal messmate and colleague. His small figure is sadly missed in the wardroom, for in times of stress or depression he never failed to instil a more balanced outlook. He had a sound clinical judgment, and though he had specialized in anaesthetics he was a reliable surgeon. I remember him operating on a gangrenous and perforated appendix while the ship was at sea off the west coast of Africa. Though the temperature of the theatre was 120° F. and tempers were becoming frayed David remained imperturbable throughout. The patient made an uninterrupted recovery.

Royal Army Medical Corps

Missing

Captain James Edward Scott Carmichael.

Prisoners of War

Major William Stanley Sykes.
Captain Charles Donald.
Captain William Gordon France.
Captain John Buchanan Fulton.
Captain John Goodworth Jamieson.
Captain George Ross Mackay.
Captain Harold William Wykes.
War Substantive Captain Graham Forrest Hay.
War Substantive Captain Geoffrey Bertrand Leyton.
War Substantive Captain John George Munro.
War Substantive Captain Kenneth Todd.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

K. V. Earle has been approved, in absence, for the degree of M.D.

UNIVERSITY OF LONDON

University College Hospital Medical School

The following scholarships, exhibitions, and prizes have been awarded at University College Hospital Medical School:

Goldsmid Entrance Scholarships.—Miss M. E. P. Hele (Newnham College, Cambridge); R. J. Williams (St. John's College, Cambridge). *Goldsmid Entrance Exhibition.*—R. H. Shephard (University College, London). *Filliter Entrance Scholarship in Pathology.*—P. Shubik (University College, Oxford). *Atchison Scholarship.*—R. E. O. Williams. *Magrath Scholarships.*—*Surgery*: O. P. G. Whitfield; *Medicine*: Miss J. W. Shrimpton; *Midwifery*: Miss S. M. Luty. *Filliter Exhibition.*—Miss G. R. Briggs and R. Barer (joint award). *Tuke Silver Medal.*—J. A. Black. *Liston Gold Medal.*—O. Daniel. *Alexander Bruce Gold Medal.*—A. L. M. Christie and Miss M. Mack. *Fellowes Silver Medal.*—T. R. Fink. *Junior Clinical Surgery Prize.*—Miss J. A. Davies. *Suckling Prize in Obstetrics and Gynaecology.*—A. L. Wolf. *Ferriere Scholarship.*—H. Melhuish.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

At the quarterly meeting of the Royal College of Physicians of London, held on July 31, with Sir Charles Wilson, President, in the chair, the following were elected officers for the ensuing year: *Censors*, W. E. Hume, A. C. Douglas Firth, J. A. Ryle, C. M. Hinds Howell; *Treasurer*, H. E. A. Boldero; *Harveian Librarian*, Arnold Chaplin; *Assistant Registrar*, R. Hilton.

The President announced the award of the Bisset-Hawkins medal to Sir Frederick Menzies for his work as Chief Medical Officer of the London County Council; the Baly medal to Prof. Edgar Allen of Yale University for his work on oestrogens; and the Murchison scholarship (by Edinburgh University) to Alan Guild, M.B.

Prof. J. C. Meakins has been asked to represent the College at the centenary celebration of the Queen's University, Kingston, Ontario.

Membership

The following candidates, having satisfied the Censors' Board, were elected to the Membership of the College:

C. L. Davidson, M.D., J. V. Davies, M.B., P. H. Denton, M.D., Flying Officer, R.A.F.V.R., W. Dodd, M.D., C. M. Fletcher, M.B., Stella M. Instone, M.B., G. A. Kiloh, M.D., H. Kopelman, M.B., A. D. Leigh, M.B., Captain, R.A.M.C., J. McMichael, M.D., F.R.C.P.Ed., Hilary F. March, M.D., H. V. Morgan, M.B., R. W. Parnell, M.B., A. M.-M. Payne, M.B., J. Reid, M.B., J. C. Roberts, M.D., R. E. Rodgers, M.D., A. Sakula, M.B., L. W. D. Scott, M.D., H. L. Sheehan, M.D., Major, R.A.M.C., Margaret D. Snelling, M.B., R. H. Taylor, M.B., J. B. L. Tombleson, M.D., L. Watson, M.B., D. A. Williams, M.D., D. Wilson, M.B., Acting Squadron Leader, R.A.F.V.R., R. Wilson, M.B.

Licences and Diplomas

Licences to practise were conferred upon the following 196 candidates (including 27 women) who have passed the final examination of the Conjoint Board, and have complied with the by-laws of the College:

E. Adler, Brenda N. Akeroyd, G. A. Anderson, E. J. Anthony, G. O. Ashworth, W. J. Atkinson, G. A. Barclay, A. G. Beaton, M. Q. Birkbeck, K. F. Blackburn, D. W. Briggs, Jutta Brokovski, W. A. Bromley, H. J. S. Browne, H. J. M. Browne, J. P. Bull, D. W. Burgess, Katherine D. Caddick, D. Caddy, J. H. Capon, L. G. Capra, W. E. Church, I. I. A. Clarke, S. N. Cole, E. D. H. Cowen, R. A. D. Crawford, C. H. K. Daly, Valerie M. K. Davies, J. J. Y. Dawson, J. C. Day, S. R. Deenadayalu, P. J. R. Deller, P. B. de Maré, M. Diamond, J. P. Donnell, G. B. Downs, Christina N. Duigan, H. L. le V. dit. Durell, K. C. S. Edwards, R. M. Ellison, M. L. H. Evans, W. H. M. Evans, A. Feiner, H. P. Ferreira, J. C. Firth, R. B. Franks, F. E. Fraser, R. Fuller, M. Gang, V. O. B. Gartside, D. S. G. Genge, J. A. Gillett, N. Gillman, C. W. Glassey, E. C. Glover, C. L. Grandage, D. McC. Gregg, H. Grylls, Joan I. Hallinan, A. P. Hardman, K. O. Harrison, J. L. G. Hartley, A. Heller, W. G. Helsby, J. A. Henderson, Joan D. K. Hilditch, C. Hirson, F. H. Howarth, G. Howells, Janet R. Humphrey, M. P. Hutchinson, E. L. Ives, B. Jackson, J. R. Jackson, P. Jacobs, C. T. A. James, Alberta M. Jeans, E. R. Jones, Evelyn A. Kaye, B. Kelion, S. K. Kellett-Smith, G. R. Kershaw, C. A. King, Doreen H. King, M. D. King, F. Kohn, Celia P. Larkins, W. S. Lewis, Ursula M. Lister, H. C. Llewellyn, Sophia Lucas, G. M. Lunn, Stella M. Luty, J. Lyons, J. M. McCurdy, J. L. B MacFarlane, Joan Mack, Sylvia I. E. Macmillan, J. M. H. McMurray, I. E. L. J. McNair, A. D. A. Machonochie, F. M. McRae, M. Makin, E. A. de la T. Mallett, J. A. Mantle, W. J. C. Markby, D. E. Marmion, A. H. E. Marshall, S. A. Mason, J. P. Matthews, P. H. N. Matthews, Violet D. Maxwell, R. J. Melhuish, S. L. Melville, A. R. H. Mills, D. V. Milward, F. S. Mooney, T. K. Morgan, F. P. Morris, G. A. Mott, R. A. Nabi, D. L. Nicholls, J. A. B. Nicholson, H. H. Nixon, J. F. North, A. O'Connor, P. H. Ogilvie, D. J. O'Meara, T. M. Ll. Owen, H. Paradis, T. E. Parry, J. H. Peacock, M. T. Pheils, J. H. C. Phillips, L. G. Picciotto, G. H. Pickering, R. J. F. H. Pinsent, R. J. Pitchford, Peggy O. M. Plews, A. Poteliakhoff, C. Reichman, Margaret E. Rhodes, C. W. Richards, G. K. Riddoch, T. B. Ll. Roberts, Dorothy H. Robertson, J. A. Robertson, E. Robinson, A. C. Rogers, M. Rosten, B. Samet, C. S. Savage, G. P. A. Sechiari, J. A. Segal, J. Seiler, B. A. Sellick, J. Shah, O. H. C. Shelswell, J. J. Shipman, M. Shoham, G. Skinner, H. Souster, Eirian Spickett, J. M. Stansfeld, A. W. P. Stone, T. P. Storey, C. G. Stringer, A. Tay, G. G. Taylor, J. G. Taylor, A. E. Thomas, E. F. Thomas, M. G. B. Thompson, Joan M. Thornton, J. P. Turney, G. K. Tutton, A. B. Unwin, Carolina M. van Dorp, C. T. Vincent, W. J. K. Walls, J. A. Ward, K. O. Warner, R. P. Warren, P. C. Watson, Mary E. Wehner, E. Wellisch, Alison D. Wells, L. Wertheim, F. T. Wheeldon, A. H. Widdup, H. L. J. Wilson, J. R. J. Winter, P. H. Wood, R. C. Woolls, G. A. Yorke, Mary Young.

Diplomas in Anaesthetics were granted, jointly with the Royal College of Surgeons of England, to the twenty-two candidates whose names were published in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of June 21 (p. 949), and Diplomas in Laryngology and Otology (four), Psychological Medicine (eleven), and Public Health (six) were granted to the successful candidates whose names were published in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of July 19 (p. 105).

The following diplomas were also granted, jointly with the Royal College of Surgeons of England:

Diploma in Medical Radiology.—G. W. Blomfield, Mary A. C. Cowell, A. Fry.

Diploma in Ophthalmic Medicine and Surgery.—K. A. Abayomi, H. C. Black, P. A. Gardiner, J. Halperin, L. H. Lake, T. A. Narayanan, Jean M. G. Shaw, J. L. S. Steele-Perkins, D. Turner.

Medical Notes in Parliament

On August 7 the Royal Assent was given to the Pharmacy and Medicines Act, as also to the National Health Insurance, Contributory Pensions, and Workmen's Compensation Act.

Pharmacy and Medicines Bill

On August 5 the House of Lords considered the Pharmacy and Medicines Bill in Committee. After technical amendments to Clauses 1 and 2, the Lord Chancellor moved an amendment to Clause 8 (Disclosure of composition of medicines). He said that the clause as printed in the Bill provided that the article recommended as a medicine must have a label to show "the appropriate designation of the substance so recommended, or of each of the active constituents thereof." Anxiety was expressed, more particularly on behalf of the herbalists, that this might be taken to mean that they had to state what were the chemical constituents in the bottle, notwithstanding that there might be quite serious changes after the contents had been put together. That would be putting on the herbalist too severe a burden. The amendment was agreed to.

On Clause 9 (Restriction of sale of medicines by unauthorized persons) Viscount Plumer moved an amendment which, he said, described the processes commonly used in the preparation of herbal medicines, but which were not mentioned in the Bill. The protection given in the clause to herbalists did not go far enough. There was nothing to permit the use of a liquid process which was necessary for the production of many tinctures, essences, and oils commonly used by the herbalist and sold by him in his shop.

The Lord Chancellor said the amendment was too wide. In the end it would lead to the production of an unlimited number of medicines whose efficacy depended on their chemical constituents produced under the alleged shelter of dealing with herbs and herbal extractions. Lord Horder said that the House had given the herbalists a certain amount of what they had asked for. Now they were asking that certain processes should be permissible in preparing those ingredients which were calcu-

lated, he believed, inevitably to result in so changing and confusing the ingredients as not to make it possible to state finally what they were. This was an effort to side-track one of the two main principles that the Bill established.

Viscount PLUMER moved another amendment dealing with the use of preservatives. He explained that it was impossible to produce a herbal medicine without some form of preservative. His amendment dealt with the addition of glycerin, alcohol, and esters of parahydroxybenzoic acid, "or such other preservative as the Ministry of Health might sanction." The LORD CHANCELLOR, resisting the amendment, said that if alcohol were used as a preservative in these cases a proportion of something like 20% of the whole mixture would probably be necessary for that purpose. Alcohol might, in fact, result in the preparation of a tincture which would be a manufactured article quite remote from the simple herbal remedy, and one having wholly different results. Lord HORDER, who also opposed the amendment, said it was very pertinent to note that no quantity or minimum amount of glycerin, alcohol, and other alcoholic preparations for use as preservatives was suggested. The action of these preservatives on the questionable derivatives remaining after macerating, infusing, boiling, and so on was such as to render the principle of the Bill, which called for disclosure, of no effect. The amendment was negatived.

The LORD CHANCELLOR moved an amendment to make it plain that the phrase in Subsection (5) (*a*), "the substance recommended as a medicine which the article consisted of or comprised," meant the whole substance contained in the article—the bottle of cough mixture or whatever it might be—and did not refer to each one of the constituents of, for example, the cough mixture.

The Committee stage was concluded. On the Report stage an amendment by Viscount BERTIE which, he said, would enable the Ministry of Health to give that help to herbalists with regard to preservatives which they so badly needed, was withdrawn. The Bill was read the third time, passed, and sent back to the House of Commons.

On August 6 the House of Commons agreed with the Lords' amendments to the Pharmacy and Medicines Bill. Miss HORSBRUGH explained that certain of these had been drafted to reassure the Society of Herbalists, whose representatives had come to the Ministry of Health a few days previously and put their difficulties before the Department.

Mr. VIANT asked the Minister of Health on July 30 to consider the position of naturopaths not retailers of herbs who prescribed for their patients, and sold tinctures, fluid extracts, and compressed tablets under the Pharmacy and Medicines Bill.

Mr. BROWN replied on August 7 that this Act did not affect the right of these practitioners to provide treatment for their patients.

Scotland's Health Services

Introducing the Estimates for the Department of Health for Scotland on July 30, Mr. T. JOHNSTON said that in the past year Scotland had escaped a major epidemic. Figures for tuberculosis were increasing, those for diphtheria were higher than ever, and those for paratyphoid, cerebrospinal fever, and influenza were slightly up. Scarlet fever, measles, and whooping-cough were decreasing. Causes of the increased incidences were the black-out, windows fastened at night, overcrowding due to evacuation, intensification of toil, and above all the long and severe winter. The campaign for immunization of children against diphtheria had been given publicity, materials had been supplied to local authorities gratis, and 500,000 children—half the total—had been treated during the year. Local authorities had been asked to concentrate their attention during the holidays upon pre-school children, whose susceptibility was greater. Mr. Johnston agreed that a larger proportion of the beds in the Emergency Hospital Service should be taken for civilians who were on the waiting lists of other hospitals. The emergency service had seven first-class hospitals and twenty new annexes to existing hospitals. The Department of Health had drawn the attention of every doctor and of all hospital authorities in Scotland to the fact that it was willing to see a large proportion of their waiting lists. He hoped those seven hospitals would be the nucleus of great service not alone for citizens in the areas where they had been built. This, with the stimulus of the Nuffield Trust, should remove the waiting lists and demonstrate the wisdom of co-operation in wide areas among hospital authorities, municipal and voluntary.

Mr. MAXTON asked Mr. Johnston to ensure that the cheap or free milk provided for the child under 5 was continued till the child received the school ration. Colonel ELLIOT said the hospital waiting lists had always been a scandal in Scotland. A person might have to wait for years for admission, and the same problem existed in the North of England. He was glad a big addition had been made to hospital accommodation. The increasing incidence of some diseases mentioned by Mr. Johnston was a warning that strain and stress were beginning to have an injurious effect on the constitution of the people. Both in Scotland and England the graphs of tuberculosis had turned upward after a long decline, which showed that close consideration should be given to nutrition.

Dr. MORGAN said there were still areas in Scotland where no organized fracture treatment was given, such as the Glasgow Royal Infirmary. Although this had an excellent clinic, treatment was completely dissociated and unorganized in the in-patient departments. Could not the Government, by grants to voluntary hospitals, introduce proper organization in both the in-patient and out-patient departments and bring these hospitals up to Grade I as laid down by the Delevingne Committee? In Scotland in 1939 only one hospital—the Glasgow Hospital—was carrying out the treatment laid down for Grade I. Three hospitals were in Grade II, none in Grades III and IV, and six in Grade V. Many dissociated rehabilitation from treatment and did not adopt it until surgical treatment was complete.

Replying for the Government, Mr. WESTWOOD said the annual report of the Department of Health had been suspended during the war, but a rough summary report would soon be available to members. Beds were available in auxiliary hospitals, and there was no justification for a waiting list. He knew of the difficulties of the medical profession, who sometimes did not want to send their work to another hospital.

The House agreed to the Estimates for the Department of Health, and also for a token Estimate for services in that Department arising out of the war, including measures in Scotland to deal with casualties and disease.

Medical Problems of the Ministry of Pensions

Estimates of £37,008,000 for the Ministry of Pensions were discussed on July 31. Introducing them, Sir WALTER WOMERSLEY said consideration had been given to the position of men who, having been passed by a recruiting board on enlistment and placed in Grade I as fit for general service, were, after effective service, discharged on account of a disability shown to have existed before enlistment. Doctors usually referred to this as a constitutional disease. He had concluded that where effective service was found to have caused aggravation in a previously existing condition, and where the man had not given the board untrue information about medical facts known to him, the Minister would be justified in regarding the aggravation as material and as bringing the case within the scope of the Royal Warrant. Under the new rule, if the doctors who examined on behalf of the Navy, Army, or Air Force had made a mistake, then the State must pay. Many cases were being reconsidered, and he hoped that all would be cleared up before long. He had secured an amendment of the Royal Warrant to give him discretion to make a reduced or even a full award where the death or disablement of a member of the Forces involved an element of negligence or misconduct. He would provide by Royal Warrant that a man in the Home Guard, when on duty, came under the same regulations as a member of the armed Forces. Hospitals under the Ministry now had a bed strength of 7,647, against 1,833 at the outbreak of war, and an additional hospital of 600 beds was nearing completion. Some hospitals had suffered severely by bombs, and in every case the staff showed bravery and zeal. The staff included 285 medical men, 100 on a part-time basis. They were all rendering splendid help. During the past year in-patient treatment was given in 5,300 cases, and 5,267 officers, nurses, and men received treatment in mental hospitals. In addition 6,605 Service and civilian casualties received treatment in Ministry of Pensions hospitals. The Government was considering the rehabilitation and training of men discharged from

Ministry of Pensions hospitals. The Ministry of Labour and Ministry of Health would come into this scheme.

Sir Henry MORRIS-JONES said that on the whole the medical service of the Ministry was very good and the medical officers were able men, but they must expect a little human frailty in these officers. He was sorry to find in the Estimates that there were between 5,000 and 6,000 mental patients as a result of the last war. He hoped the medical officers kept up to date in this branch of medicine. He thought medical boards should be more careful in the questions about past illnesses which they put to recruits. Sometimes the men were nervous and the questioning was not clearly done. A number of the men on the medical boards were too old. If the medical power of this country were correctly distributed the Ministry would have no difficulty in securing personnel for the appeal tribunals.

Sir WALTER WOMERSLEY stated that the committee which, under Mr. Shakespeare, was considering the distribution of medical personnel was investigating whether the Government should not transfer doctors from one Service to another, and whether more doctors could be made available for hospital services and for service upon appeal tribunals. The subject would be reconsidered by the Ministry of Pensions when the committee reported.

The House then approved the Estimates of the Pensions Ministry, and also those of the Ministry of Health, the Board of Control, the Home Office, Broadmoor Criminal Lunatic Asylum, and other Departments.

Fracture Treatment

Dr. MORGAN, on August 7, asked the House to consider the treatment of injured workers. He said it was realized in 1935 that the fracture work and treatment developed in the last war had been allowed to go down. A B.M.A. Committee then reported on professional fracture work in the best hospitals. It said there was inadequate organization of fracture treatment, imperfect surgical treatment, failure in putting fragments together, failure in giving proper functional activity. The surgical chaos was due to lack of organization. The Delevingne Committee confirmed these recommendations, and asked that fracture treatment should be organized. At the time that committee reported there were only three hospitals in Wales where adequate treatment could be obtained. In Scotland there was then only one Grade I hospital. Recently Mr. Johnston had stated that there were six new orthopaedic hospitals in Scotland, but he did not say whether they were of Grade I standard. In England out of 1,100 hospitals only 74 were now in Grade I. Even the Voluntary Hospital Association was dissatisfied with the position. He asked what progress had been made during two years of war in Grade I orthopaedic hospitals or ordinary hospitals. Supplementation of orthopaedic centres was not enough. In these emergency hospitals equipment was incomplete. Sometimes there were dangerous instruments. Even now dangerous *x*-ray instruments were said to be supplied and had been referred to in the *British Medical Journal* of the previous week. Was the Ministry of Health properly advised in these matters from the professional point of view? Did the Minister and his advisers accept without reserve the recommendations of the 1939 British Medical Association Fracture Committee as confirmed by the Delevingne Committee with regard both to treatment and to organization of treatment. What progress had been made in the last twenty-four months in grading hospitals? Why did the Minister classify his hospitals on new lines rather than by the grading of the Delevingne Committee?

Miss HORSBRUGH said it was impossible to answer all Dr. Morgan's questions forthwith. She had no responsibility for hospitals in Scotland. She invited Dr. Morgan to specify the hospitals in England and Wales where treatment was not as it should be. The reason why orthopaedic centres were not graded as suggested by the Delevingne Committee was that the Ministry did not wish to rely for long-term work on hospitals in vulnerable areas. The work had been divided between new orthopaedic centres and new fracture centres, "A" and "B." "B" were short-term ones in vulnerable areas. The Ministry's consultant experts dealt with this problem, and in each region consultants saw that there was organization and segregation of the people to be treated, and that they had their treatment from start to finish. In the orthopaedic centres there were about 5,000 beds and in the fracture "A" departments 5,000 beds. There were 10,000 extra new beds. Persons entitled to benefit from the Emergency Medical Services comprised a large proportion of the population.

Food and Nutrition in Scotland

On July 29, Mr. JOHNSTON informed Mrs. Hardie that he was aware of the conclusions arrived at by the Ministry of Food on the necessary ingredients of a balanced meal. It was the duty of education authorities to provide meals for all necessitous school children, and he had encouraged authorities to extend this service to all other school children on payment of the bare cost of the food. At present about 50,000 school children in Scotland were obtaining a well-balanced meal daily.

Mr. SLOAN asked the Secretary of State for Scotland whether he was aware that the nutrition of certain classes of workers in Scotland was inadequate, and compared unfavourably with the nutrition standards provided for other classes of workers; and whether he would take steps to provide adequate and equal nutrition for all workers. Mr. JOHNSTON said that the policy of the Government had been and was to provide adequate nutrition for all classes of workers. If, as he assumed, Mr. Sloan had in mind any disparity in the provision of food canteens and especially at the coal pits in Scotland, he assured him that the matter was receiving urgent attention.

Tuberculosis in Wartime

On July 31, Mr. JAMES GRIFFITHS asked what measures were being taken to prevent an increase in the incidence of tuberculosis among women such as occurred in the last war with the entry of large numbers of women workers into industry. Mr. ERNEST BROWN said prevention of tuberculosis depended on factors such as the conditions of housing and the adequacy of diet, coupled with the segregation of infective cases. These services had been much developed since the last war. The importance of maintaining them to the fullest possible extent so far as wartime conditions permitted was fully recognized.

Registration for Milk

Major LLOYD GEORGE announced on August 6 that one pint of liquid milk per day would continue to be available to all expectant mothers and infants under 5 years of age. Half a pint per day would be available for children and adolescents up to the end of their 17th year on payment of full current prices. To assist in the distribution of milk to the remainder of the population, all members of the public would be required to register for milk. A formal rationing scheme for milk was undesirable. The cheese ration would be increased to 3 oz. per head from August 25. The ration of 8 oz. for the priority classes would remain unchanged.

Potato Flour for Bread—The Fruit Crop

Replying to Lord Bledisloe in the House of Lords on August 6, the DUKE OF NORFOLK said factories would be completed by the end of the year to turn out 80,000 tons of potato flour annually capable of being used with wheat flour in the making of bread. The crop of home-grown soft fruit did not exceed half the normal, and of stone fruits, other than cherries, not more than a quarter. Apples and pears were well below the average. The black-currant crop was estimated not to exceed 4,000 tons. The Government had arranged compulsorily to acquire 2,000 tons for manufacture of concentrated black-currant juice to be distributed free of charge to all children below the age of 1 year to provide vitamin C.

Payments to Insurance Practitioners

Mr. BROWN informed Mr. Thorne on August 7 that there are in England and Wales 17,290 doctors under contract with Insurance Committees. In 1940 they were paid £7,674,127 in respect of treatment, £251,938 for drugs, £256,767 for mileage, a total of £8,182,832. Mr. Brown added that during the year ended December 31, 1940, a total sum of £17,948,000 was expended in Great Britain on sickness and disablement benefits under the National Health Insurance Acts.

More Medical Officers for Home Guard.—Instructions will soon be issued authorizing the appointment, where necessary, of medical officers to Home Guard companies, in addition to the officers at present authorized for battalions.

Notes in Brief

Asked by Dr. Summerskill to use wild rose-hips as a source of vitamin C, Major Lloyd George said it was intended to encourage the use of these and other hedgerow products this autumn.

In view of arrangements for making supplies of milk available, Mr. Lloyd George is advised that it is unnecessary to grant supplementary allowances of rationed foods to persons suffering from tuberculosis.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

Enteric fever and dysentery have again risen in incidence in England and Wales during the week, and increases were also recorded in Scotland. The figures for typhoid and paratyphoid fevers are now recorded separately, but dysenteries of whatever type are not; the Sonne form is the prevailing type, but several instances of Flexner infection have appeared here and there. Notifications of diphtheria are higher in England and Wales and in Ireland, but remain at the same level in Scotland. Cerebrospinal fever has remained stationary in England and Wales.

Typhoid and Paratyphoid Fevers

Although widely distributed among nineteen administrative areas, only in two were more than 3 cases of typhoid fever notified during the week—namely, Lancaster 12 (Manchester 2, and 1 each in Preston, Rochdale, Warrington, Crosby M.B., Fleetwood M.B., Hindley U.D., Lancaster M.B., Leyland U.D., Whitefield U.D., and Limehurst R.D.); Chester 4 (Tarvin R.D. 3, Sale M.B. 1). The three Scottish cases occurred in the county of Ayr. Paratyphoid fever was both prevalent and widespread, affecting twenty-eight areas—notably Lancaster 179, Chester 44, Northampton 17, Stafford 12, Glamorgan 10. The Birmingham outbreak may be regarded as having come to an end. In Scotland ten areas were affected, but only in three was there more than a single case—namely, Glasgow 13, Dundee 7, Roxburgh County 2.

Dysentery

Compared with enteric fevers the incidence of dysentery is low, but it is probable that many cases of the Sonne type are missed, especially in children, in whom the disease is characteristically mild. Even when careful bacteriological examination of the faeces is made, positive results are obtained in less than 50% of the clinical cases. With rectal swabs, and with the use of specially enriched media, few cases are missed. Faeces are as reliable as rectal swabs for cultural specimens from carriers and convalescents. Of the eleven areas reporting cases during the week, more than 10 were recorded in four—namely, Lancaster 30, Hertford 15, Surrey 12. In Scotland incidence is also relatively high, although few areas—three counties and six burghs—are involved, chiefly the county of Lanark 16, and the burghs of Glasgow 10, Dundee 8, Airdrie 3, and Edinburgh 3.

Acute Poliomyelitis

The 10 cases of poliomyelitis notified during the week occurred singly, in Buckinghamshire (Slough M.B.), Cornwall (St. Austell U.D.), Cumberland (Millom R.D.), Devon (Kingsbridge R.D.), Essex (Rochford R.D.), Hertford (Hoddesdon U.D.), Leicester (Leicester City), Radnor (Presteign U.D.), while 2 cases occurred in Glamorgan—in Porthcawl U.D. and Penybont R.D.

In Buckinghamshire 9 cases (1 fatal) have been reported in all at the time of going to press: 6 in the borough of Slough and 3 in Eton rural district, in six schools. These schools have been closed, and every effort has been made to prevent children from crowding together in cinemas and other places of entertainment. In the early cases there was a prolonged pre-paralytic meningeal stage during which lymphocytic choriomeningitis was closely simulated. The fatal case occurred on the fourth day of illness in a boy 8 years of age.

No. 29

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended July 19.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1941					1940 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	184	11	42	3	8	177	14	57	1	4
Deaths		2	2				1	2		
Diphtheria	852	23	161	27	32	818	25	214	33	29
Deaths	19	—	3	—	1	23	2	6	1	—
Dysentery	85	2	44	3	—	87	—	40	—	—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	2	—	—	—	—	3	—	—	—	—
Deaths		—	—				—	—		
Enteric (typhoid) fever	44	1	3	5	6*	65	6	12	5	2
Deaths	6	—	1	—	—	—	—	—	—	—
Erysipelas		—	35	9	1		23	39	3	2
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years										
Deaths	35	1	5	12	5	23	5	5	9	7
Measles	4,610	130	48	191	—	9,892	32	888	—	26
Deaths	3	1	—	5	—	5	—	12	—	1
Ophthalmia neonatorum	88	5	17		—	113	9	31		—
Deaths										
Paratyphoid A and B	329	7	29	—	—					
Deaths	—	—	—	—	—					
Pneumonia, influenzal†	531	18	3	—	—	434	23	5	5	9
Deaths (from influenza)	4	12	2	1	—	6	1	1	—	5
Pneumonia, primary			108	16				139	13	
Deaths		—		3	—		13		3	5
Polio-encephalitis, acute	4	1				5	—			
Deaths		—					—			
Poliomyelitis, acute	10	—	4			18	—	3		
Deaths		—	—				1	—		
Puerperal fever	—	—	12	2	—	2	2	13	3	—
Deaths		—					—			
Puerperal pyrexia	132	11	11		4	166	10	12		3
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	718	24	128	31	16	1,343	28	132	29	57
Deaths	—	—	—	—	—	—	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	7	3	—
Deaths			—	—	—			—	—	—
Whooping-cough	4,662	244	49	122	5	878	11	35	—	16
Deaths	24	2	2	2	1	3	1	2	—	2
Deaths (0–1 year)	262	21	53	20	16	265	36	56	24	24
Infant mortality rate (per 1,000 live births)										
Deaths (excluding stillbirths)	3,709	447	534	169	97	3,936	576	543	150	144
Annual death rate per 1,000 persons living			11.6	11.2	‡			11.0	10.0	12.6
Live births	4,565	345	789	324	185	5,869	850	835	393	242
Annual rate per 1,000 persons living			16,0	21.5	‡			16.9	26.2	21.2
Stillbirths	187	9	39			224	31	38		
Rate per 1,000 total births (including stillborn)			47					44		

* Includes paratyphoid A and B for Northern Ireland.

† Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Medical News

Dr. Frederick Wharton, a surgeon of Lexington, Kentucky, has been elected president of the American Medical Association.

The Home Secretary has appointed Sir Robert Kelly to be a member of the Advisory Committee on the administration of the Cruelty to Animals Act, 1876, in place of the late Sir D'Arcy Power.

Major Alexander Wilson, O.B.E., M.D., has been appointed a Deputy Lieutenant for the County of London.

Jaconet (as defined by the *British Pharmaceutical Codex*) may be obtained coupon-free if sold in pieces not exceeding forty-five inches in length or breadth.

According to the *Schweizerische medizinische Wochenschrift*, a census of persons suffering from venereal disease in Germany carried out in June, 1940, showed that there were, in round numbers, 122,000 men and 75,000 women. These figures imply that the usual increase in these diseases in wartime had not then taken place.

The distinguished service medal for scientific achievement of the American Medical Association has been presented to Dr. James Ewing, formerly director of the laboratories of the Memorial Hospital, New York.

A pamphlet on family allowances, by Mrs. E. M. Hubback, issued by the Family Endowment Society (19, Wellgarth Road, N.W.11) provides an up-to-date short statement on the case for the immediate introduction of a State-paid scheme of family allowances. Its purpose is to show the impracticability of dealing with child poverty among larger families in any other way, especially in wartime.

The Narcotics Division of the League of Nations has been moved from Geneva to Washington.

We regret to announce the death at the age of 85 of Sir Alfred Rice-Oxley. We hope to publish a memoir in our next issue.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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QUERIES AND ANSWERS

Timepiece for Blind Person

"INQUIRER" writes: Can any reader give advice as to a suitable timepiece for an old lady who has recently become blind? Her intelligence is good but adaptability only fair. She gets very agitated at not being able to tell the time.

Diminution in Size of Breasts after Childbirth

Dr. H. D. MOORE (Carlisle) writes: I have a patient whose breasts have become rather shrunk and pendulous after childbirth. She is a young woman of 23; first child 6 months, unable to breast-feed it, although efforts were persisted in. Her general health has not been very good. She has lost a little weight—about 6 lb.—and has had a cough, which is now quite well: tuberculosis has been excluded. She is worried about this. Can anyone suggest any treatment, apart from general methods, to improve her health and put on weight?

Income Tax

Travelling Expenses

"G. H." received £260 in medical fees for work under the Military Training Act. Attendance at the board necessitated travelling fourteen miles on each occasion. The £260 was his only earnings for 1940-1. The cost of travelling has been refused.

*** As we understand the position, "G. H." accepted an appointment which necessitated attendance at premises some distance away, and his work was carried on there. Such expenses have been judicially held to be incurred before or in preparation for carrying out the duties of the employment and not (as required by the statute) "wholly, exclusively and necessarily in the performance of the duties." They are, therefore, not allowable as deductions. In the result "G. H." may not unnaturally feel that he is placed under hardship—a feeling which the large body of employees who live in suburbs and work in the centres of crowded areas fully share. In a recent debate, however, the Chancellor of the Exchequer said he was unable to redress the grievance.

Sale of Practice: Instalment Payments

"BETA" is arranging to sell his practice at one and a half years' purchase—that is, "50% of the income from the practice for each year for three years." If that is done how will income tax be affected?

*** "Beta" should see that the agreement for sale of the practice is expressed in such a way as to make it clear that the practice is being sold for a capital sum to be satisfied by payment for three years of 50% of the gross income. If that is done the payments will rank as capital sums and will not be taxable in his hands. The deciding case on the point is Commissioners of Inland Revenue *v.* Ramsay.

Deduction for Nominal Rent

"A. P." owns his residence, which is assessed at £64 for payment of income tax, Schedule A. There are twelve rooms, of which four are used for professional purposes. What amount should he charge in his professional accounts as "rent"?

*** As the rent is treated as £64 net for payment of income tax, Schedule A, he must take that as a basis for calculating the deduction. The four rooms used professionally are presumably on the ground floor—that is, the most valuable floor—and possibly do not include the garage. On the whole, one-half of £64—that is, £32—seems to be a reasonable deduction. (It is assumed that the cost of repairs, decorations, etc., of the professional rooms is charged separately.)

LETTERS, NOTES, ETC.

Flat-foot in Recruits

Dr. W. F. BENSTED-SMITH (Newton Ferrers) writes: I can endorse the results quoted by Captain Sachs and Lieut. Gibson (July 26, p. 127) from the use of rubber as a support. I have for some years used pads shaped from rubber sponges and held in position by adhesive or sewn into socks for bad flat-foot in farm workers and ploughmen (a comparable class) with most cheering results.

The Unburned Cornea

Dr. ARTHUR GREENE (Norwich) writes: In the *Journal* of July 12 (p. 74) under the above heading, after a reference to one of Jules Verne's wonderful books, attention is drawn to cases of patients whose corneas have escaped serious injury though enveloped by molten metal. One would scarcely expect such good luck in the case of a chemical burn, but, a good few years back now, I was called urgently to see a boy (aged about 16) whose eye had just been injured by an explosion while working in the school chemical laboratory. My horror can be imagined on recognizing the boy as one who, I knew, had lost the vision of one eye some nine years previously, and that it was the "good eye" which had received the chemical. The entire cornea was covered up by a dark and adherent rough mass, for all the world like a piece of charcoal moulded to the cornea. Although, fortunately, I had not the courage to say so, I thought it obvious that he was doomed to permanent blindness. The eye made an excellent recovery, and when last I heard of him he was holding an important business position "out East." A prognosis as regards vision should never be given at the first examination of an eye burned physically or chemically, especially a "lime burn," which, though it may look trivial at first, frequently leads to severe visual defect.

The Editor of the *Medical Directory* asks members of the medical profession who have not communicated to him their present addresses to do so without delay, otherwise the words "Address unknown" will appear in lieu of an address in the forthcoming 1942 edition.